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THE

ESSENTIALS OF MATERIA MEDICA AND THERAPEUTICS.

It has been considered desirable to make two separate Books of the Work originally announced under the title of "Medicines: their Nature and Value in the Treatment of Disease."

The "Essentials of Materia Medica and Therapeutics" is now published, a work of the kind being much in request at the present time. It will be followed by a Companion Work completing the original idea, and devoted exclusively to the consideration of the value of Medicines in the treatment of Disease. Each Book will be complete in itself.

May, 1864.

MPha
G.

James Thorburn
119 Church St
Toronto
1870

THE

ESSENTIALS

OF

MATERIA MEDICA

AND

THERAPEUTICS.

BY

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PREFACE TO THE AMERICAN EDITION.

The work of Dr. Garrod supplies a want that has long been felt on this side of the Atlantic. It gives a succinct but accurate account of the natural history, of the physical and chemical properties of the articles of the Materia Medica, and of the adulterations to which they are frequently subjected; the physiological action and the therapeutic application of Medicines are very concisely given, but the absence of confused and sometimes contradictory details is often an advantage to the Student. The Editor has confined himself to supplying a few of the omissions of Dr. Garrod, and to indicating, where a difference exists, the preparations of the Pharmacopœia of the United States. His aim has been to make such additions only as are strictly necessary for the American Student, keeping in view constantly the plan and scope of the original work.

New York, *February* 25, 1865.

PREFACE.

The Author of the present volume has for some years devoted time and attention to a special study of the therapeutic action of drugs, and had hoped ere this to place the results of his labour before the Profession. In the progress of his task, however, he has discovered that every new fact obtained, suggested a new subject for investigation and research, while the experience gained by clinical observation did not tend to diminish the difficulties which seemed to him to surround so exhaustless an inquiry. He was, moreover, unwilling to content himself with a compilation of the data collected by others, or with that apparent simplification of the subject so common in works on Therapeutics, but which too often results only from a hasty credence in statements consonant with the writer's ideas, and a neglect of others not in harmony with those preconceived conclusions.

It was the intention of the Author to have appended to the present volume a more detailed account of his experience of the treatment of disease derived from clinical study, but the publication of the British Pharmacopœia rendered it desirable that a text-book should be immediately in the hands of the Student and Practitioner of Medicine, and hence the second edition of the "Essentials of Materia Medica and Therapeutics" is now published alone. The Author still hopes, in the course of a few months, to bring before the Profession a separate volume devoted exclusively to the value of medicines in the treatment of disease, and embracing the whole subject of Therapeutics.

The present work is intended to serve as a text-book of Materia Medica, and while it is hoped that it omits nothing essential to the study of the science, it excludes such details as are often em-

barrassing to the Student and seldom necessary to the Practitioner. It has been his object, while limiting its size, to include all points connected with the officinal preparation of medicines, and so much information on the therapeutic action of drugs as would serve as a sufficient guide in actual practice. All controversial points have been avoided, as unsuited to the design of the work; and the information confined to the facts really ascertained as to the action of each drug, and the purposes for which it has been advantageously employed.

A Table of Contents, by a glance at which the reader will at once see all drugs scientifically arranged, together with their pharmaceutical preparations, is contained in the present edition; as likewise a Table indicating the principal changes of nomenclature and important differences of strength between preparations in the British Pharmacopœia and in the London Pharmacopœia, 1851; and lastly, a somewhat copious Posological Table is now introduced.

Under some articles there will be found references to Appendix A. and Appendix B.; when such is the case it implies that the substance is contained in the Appendix of the British Pharmacopœia.

The Author desires, in conclusion, to express his obligations to Dr. Footman for the assistance kindly rendered in the preparation of the present edition of the "Essentials of Materia Medica and Therapeutics."

84 Harley Street, Cavendish Square, W.,
May, 1864.

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TABLE.

The following Table exhibits the more important differences between the nomenclature of the London Pharmacopœia, 1851, and the British Pharmacopœia, 1864. The substances represented by the names which stand opposite to one another in the columns of the table, are, for all practical purposes, identical. The second division of the table indicates those alterations in the strength of preparations of sufficient importance to render them *essential* to be borne in mind in prescribing. Many minor differences of strength will be discovered, depending on the alteration in the value of the solid ounce; but even when these occur in the preparations of the more active medicines, they will not materially influence the doses, being far less than those due to the varying qualities of drugs:

London Pharmacopœia, 1851.	British Pharmacopœia.
Ammoniæ Sesquicarbonas	Ammoniæ Carbonas
Antimonii Oxysulphuretum	Antimonium Sulphuratum
Antimonii Potassio-Tartras	Antimonium Tartaratum
Bismuthi Nitras	Bismuthum Album
Calx Chlorinata	Calx Chlorata
Chloroformyl	Chloroformum
Ferri Potassio-Tartras	Ferrum Tartaratum
Hydrargyri Bichloridum	Hydrargyrum Corrosivum Sublimatum
Hydrargyri Biniodidum (1836)	Hydrargyri Iodidum Rubrum
Hydrargyri Chloridum	Calomelas
Hydrargyri Iodidum	Hydrargyri Iodidum Viride
Hydrargyri Precipitatum Album	Hydrargyrum Ammoniatum
Hydrargyri Nitrico-Oxidum	Hydrargyri Oxidum Rubrum
Iodinium	Iodum
Liquor Chlorinii	Liquor Chlori
Liquor Sodæ Chlorinatæ	Liquor Sodæ Chloratæ
Magnesia	Magnesia Levis
Magnesiæ Carbonas	Magnesiæ Carbonas Levis

(The heavy variety of Magnesia and its Carbonate being now termed Magnesia and Magnesiæ Carbonas.)

London Pharmacopœia, 1851.	British Pharmacopœia.
Oleum Tiglii	Oleum Crotonis
Plumbi Oxidum	Lithargyrum
Potassæ Hydras	Potassa Caustica
Potassii Sulphuretum	Potassa Sulphurata
Quinæ Disulphas	Quiniæ Sulphas
Sacchari Fæx	Theriaca
Sapo	Sapo Durus
Thus	Thus Americana

Confectio Amygdalæ	Pulvis Amygdalæ Compositus
Confectio Aromatica	Pulvis Cretæ Aromaticus
Infusum Rosæ Compositum	Infusum Rosæ Acidum
Mistura Camphoræ	Aqua Camphoræ
Pilula Galbani Composita	Pilula Assafœtidæ Composita
Pilula Saponis Composita	Pilula Opii
Pulvis Ipecacuanhæ Compositus	Pulvis Ipecacuanhæ cum Opio
Pulvis Kino Compositus	Pulvis Kino cum Opio
Tinctura Camphoræ Composita	Tinctura Camphoræ cum Opio

ALTERATIONS IN STRENGTH.

The dilute mineral acids, although a little altered, are not sufficiently so as materially to affect the doses.

Decoctum Scoparii is now simple, without Juniper and Taraxacum.

Extractum Colocynthidis Compositum restored as in Ph. Lond. 1836.

Pilula Colocynthidis Composita is the same as the Edinburgh preparation, containing powdered Colocynth pulp.

Extractum Jalapæ is made with cold water and spirit, in place of boiling water, and is about twice the strength of the Extractum Jalapæ of 1851.

Extractum Colchici, and Extractum Colchici Aceticum, are stronger than the same preparations of 1851, from the subsidence of the starch being allowed to take place before the concentration of the juice.

Extractum Stramonii is made with proof spirit in lieu of water, and is therefore a much stronger preparation, and less liable to mould, than the Extract of the London Pharmacopœia.

Infusum Aurantii contains neither lemon-peel nor cloves.

Infusum Calumbæ is made with cold water.

Infusum Gentianæ Compositum contains spirit and coriander, but no lemon-peel.

Infusum Quassiæ is made with cold water.

Liquor Ammoniæ Acetatis is *five* times stronger than that of 1851.

Liquor Potassæ and Liquor Sodæ, although a little altered in strength, are not sufficiently changed to affect the dose.

Liquor Morphiæ Hydrochloratis is half the strength of the London preparation.

The Spirits of the British Pharmacopœia, made by dissolving the volatile oils in rectified spirit, are now of uniform strength, and contain one fluid part of oil to nine fluid parts of rectified spirit, and may be regarded as essences; they have no relation to the corresponding spirits of the London Pharmacopœia, some being thirty-one times, and some as much as ninety-five times stronger.

Spiritus Chloroformi contains one part by measure of chloroform to nineteen of rectified spirit, and is a substitute for the preparation previously called *Chloric Ether*, which varied much in strength.

Syrupus Sennæ is now much stronger, and is an efficient preparation.

Tinctura Aconiti is about one-third the strength of the London Tincture, 1851.

Tinctura Belladonnæ is about half the strength of the London Tincture, 1851.

Tinctura Conii Fructus, about twice as strong as Tinctura Conii (Folia) Lond. 1851.

Tinctura Digitalis, about one-sixth stronger than the London Tincture.

Tinctura Opii, only diminished in strength in the ratio of 437·5 to 480.

Tinctura Zingiberis, about twice as strong as the Tincture, 1851.

Vinum Ferri now contains one grain of tartarated iron in each fluid drachm of the preparation.

Vinum Opii is made with powdered opium in lieu of the extract, and contains no aromatic substances; it is of the same strength as the tincture of opium.

THE

ESSENTIALS OF MATERIA MEDICA AND THERAPEUTICS.

MATERIA MEDICA.

INTRODUCTION.

In the various preparations contained in the first part of this work, constant reference is made to weights and measures, temperature, &c.; and it is therefore important that these should be clearly understood.

In the British Pharmacopœia the weights employed differ from those previously used in any other similar work; the apothecaries' weight of the London and Edinburgh Pharmacopœia has been abolished, and the avoirdupois pound and ounce adopted, together with the troy grain; the subdivisions of the avoirdupois ounce introduced into the Dublin Pharmacopœia in 1850, have likewise been discarded, and there is now no intermediate weight between the ounce and grain. The measures remain the same as those of the London, Edinburgh, and Dublin Pharmacopœias. The weights and measures of the British Pharmacopœia are as follows:—

WEIGHTS.

1 pound	. .	lb.	=	16 ounces	= 7000 grains.
1 ounce	. .	oz.	=	. .	= 437·5 grains.
1 grain	. .	gr.	=	. .	= 1 grain.

MEASURES.

1 gallon	. .	C	=	8 pints	. O viij.
1 pint	. .	O	=	20 fluid ounces	fl. oz. xx.
1 fluid ounce	.	fl. oz.	=	8 fluid drachms	fl. drs. viij.
1 fluid drachm	.	fl. drm.	=	60 minims	. min. lx.
1 minim	. .	min.	=	1 minim	. min. j.

All liquids are ordered by measure unless it is stated otherwise.

It will be observed, that in the above table symbols representing the different weights and measures have been introduced: lb. representing the pound, oz. the ounce, and gr. the grain; it will also be seen that the numbers made use of under the weights are

of the Arabic character. The symbols for the measures are C, for the gallon; O, the pint; fl. oz., the fluid ounce; fl. drm., the fluid drachm; and min., the minim; and the numbers, instead of being Arabic as in the case of the weights, are the Roman numerals.

In the present work, when quantities are introduced, the Arabic numbers have been in all cases adopted; in writing prescriptions either may be made use of.

It will be seen that the solid drachm and the scruple have been omitted from the Pharmacopœia; if still made use of, they will represent sixty and twenty grains respectively in Great Britain, and not the eighth and twenty-fourth part of the avoirdupois ounce; but in Ireland these same symbols will only represent 54·68 and 18·22 grains. Such being the case, it will be advisable to discard the employment of these symbols altogether.

The avoirdupois fluid ounce corresponds to the solid ounce, in the case of distilled water at 60° Fah.; that is, one fluid ounce weighs exactly an ounce. A minim of distilled water, however, does not weigh one grain, as the fluid ounce is divided into 480 minims; the solid ounce into 437·5 grains only.

In Appendix D of the Pharmacopœia the following table is contained, showing the relation between the measures and weights now made officinal in pharmacy, and likewise the relation of the weights and measures of the British Pharmacopœia to those of the metrical system.

RELATION OF MEASURES TO WEIGHTS OF THE BRITISH PHARMACOPŒIA.

1 gallon	=	the measure of	10	pounds	of water.
1 pint	=	"	"	1·25	"	"
1 fluid ounce	=	"	"	1	ounce	"
1 fluid drachm	=	"	"	56·68	grains	"
1 minim	=	"	"	0·91	"	"

[In the Pharmacopœia of the U. S. the troy pound is employed, and the divisions, with their signs annexed, are given in the following table :—

The pound lb.	contains	twelve ounces, ℥.
The ounce		eight drachms, ʒ.
The drachm		three scruples, ℈.
The scruple		twenty grains, gr.

The term pound, however, is disused and the weight is expressed in ounces, each containing four hundred and eighty grains. The drachm and scruple are also disused, and replaced by their equi-

valents in grains. The weight of the grain is the same in both the Br. and the U. S. Pharmacopœia. The avoirdupois oz. of the former contains but 437·5 grains or 42·5 less than the troy ounce, while the troy lb. contains 5760 grains or 1240 grains less than the avoirdupois pound. In the measures, instead of the imperial pint weighing 8750 grains of water at 62° F. and at a barometric pressure of 30 inches, the U. S. Ph. adopts the old wine measure, which weighs 7289·725 grains of water, under similar precautions, that is, 1460·225 grs. or about $\frac{1}{6}$ less than the pint of the Br. Ph., and its measures are always expressed in pints or parts of a pint. Again, in the U. S. Ph.,

The pint, O	contains	sixteen fluid ounces, $f\mathfrak{Z}$ j.
The fluid ounce		eight fluid drachms, $f\mathfrak{Z}$ j.
The fluid drachm		sixty minims, $\mathfrak{m}$ l.]

RELATION OF WEIGHTS OF THE BRITISH PHARMACOPŒIA TO METRICAL WEIGHTS.

1 pound . . .	=	453·588 grammes.
1 ounce . . .	=	28·349 "
1 grain . . .	=	0·0648 "

RELATION OF MEASURES OF THE BRITISH PHARMACOPŒIA TO METRICAL MEASURES.

1 gallon . . .	=	4·543458 litres.
1 pint	=	0·567932 "
1 fluid ounce . . .	=	0·028396 "
1 fluid drachm . .	=	0·003550 "
1 minim . . .	=	0·000059 "

The following remarks concerning certain groups of pharmaceutic preparations contained in the British Pharmacopœia may prove of service to the reader, by enabling him to discover at a glance the nature of their more important general characters, and facilitating the understanding of some peculiarities in nomenclature and methods of preparation found in many of them.

Acida. Acids. Among this group, directions are found for making certain *dilute acids*, and the same rule has in most instances been followed ; for example, Acidum Hydrochlorium Dilutum, Acidum Nitricum Dilutum, Acidum Nitro-hydrochlorium Dilutum, Acidum Phosphoricum Dilutum, and Acidum Sulphuricum Dilutum, will be seen to have nearly the same neutralising powers, measured, except in the case of dilute phosphoric acid, by the amount of an alkaline solution which they are capable of saturating. Acidum Sulphuricum Aromaticum, which is really a dilute acid, is some-

what weaker; and Acidum Aceticum Dilutum has been so formed as to assimilate it closely in strength with Acetum, or vinegar. Acidum Hydrocyanicum Dilutum hardly belongs to the same category of medicines, as it is not employed on account of its acid properties.

Aquæ. Waters. The waters of pharmacy consist of water holding in solution very small quantities of oils or other volatile principles. In the British Pharmacopœia two principal methods are adopted for making these preparations. In the first, the part of the plant is ordered to be placed with water in a retort, and a certain quantity of water brought over by distillation; this is the case with the dill, caraway, cinnamon, fennel, cherry-laurel, pimento, rose, and elder-flower waters.

The second method consists in distilling the volatile oils, previously obtained from the plants, with water; peppermint and spearmint waters are thus prepared.

Aqua Camphoræ, formerly termed Mistura Camphoræ, is made simply by allowing water to dissolve as much camphor as it is capable of taking up; and Aqua Destillata is only water distilled with such precautions, as to ensure its freedom from any appreciable or important amount of foreign matters.

Cataplasmata. Cataplasms or Poultices. Cataplasms are soft, moist, local applications, employed sometimes solely for the sake of their moisture and temperature, but more frequently, in addition to these properties, on account of certain peculiar active remedies contained in them.

The basis of the cataplasms in the British Pharmacopœia is linseed meal, either alone, or united with bread or flour; boiling water is employed for mixing the ingredients, except in the case of Cataplasma Fermenti, when water at 100° Fah. is made use of, in order that the catalytic powers of the ferment may not be injured by the heat. Olive oil is added to the Cataplasma Lini as a substitute for the natural oil which has been removed from the linseed by expression.

Confectiones. Confections, Electuaries, or Conserves. Confections are used sometimes merely as a basis for pill masses, &c., sometimes for the exhibition of sparingly soluble remedies which require to be administered in bulky doses. Honey or sugar, or both these substances, form a prominent part of all confections.

Decocta. Decoctions. A decoction is a watery solution of a medicinal substance prepared by boiling. The length of time ordered in the Pharmacopœia is in most instances from ten to twenty minutes; in some cases boiling for an hour is directed, and, in one instance, Decoctum Granati Radicis, two pints are to be reduced to the bulk of a pint. The length of time should be proportionate to the solubility of the active matter of the drug; but prolonged boiling is often objectionable from rendering this portion less active, or even inert. In two decoctions only, namely, Decoctum Aloes Compositum and Decoctum Sarsæ Compositum, are the preparations made compound by the introduction of more than one active drug. Only those medicines should be used in the form of decoction which contain active principles not injured by the boiling temperature; if volatile oils are present, these are dissipated in the process. Decoctions should be strained when hot, as a deposit of active matters occasionally takes place when the preparation becomes cold, as in Decoctum Cinchonæ Flavæ.

All the decoctions are prepared from vegetable substances.

Extracta. Extracts. Many different kinds of extracts are to be found in the British Pharmacopœia.

1. Some consist of the fresh juice, reduced to the state of solid extract by evaporation: these are commonly termed fresh or green extracts, and are ordered to be prepared in the following manner. The juice obtained from the fruits of the plant, leaves and flowering tops, &c., is first heated to 130°, in order to coagulate the *green colouring matter*, filtered and heated to 200°, at which temperature the *albumen* is coagulated. After being again filtered to remove the albumen, the juice is evaporated at a temperature not exceeding 140° to the consistence of a thin syrup, and the colouring matter, previously separated by the first coagulation, is added, and the whole evaporated to the proper consistence of an extract.

It will be observed, if the details of the process be examined, that the colour of a green extract is no test of its goodness, for the evaporation of the bulk of the juice may have been carried on at too high a temperature, and yet the product may preserve its green appearance, provided the last part of the process be carefully conducted.

The green extracts of the Pharmacopœia are Extractum Aconiti, Extractum Belladonnæ, Extractum Conii, and Extractum Hyoscyami. Extractum Colchici, Extractum Colchici Aceticum, and Extractum Taraxaci, are formed in a similar manner, with the exception that in the preparation of these extracts the temperature of the juice is at once raised to 212° to coagulate the albuminous matters, and the filtered juice afterwards reduced to the proper consistence at a temperature of 160°.

2. A second group of extracts is formed from the drugs in a dry state, by the action of cold or boiling distilled water, by which means all the matters soluble in this menstruum are dissolved, and the fluid afterwards reduced by evaporation to the proper consistence. In this manner the following extracts are prepared :—

Extractum Aloes Barbadensis, Extractum Aloes Socotrinæ, Extractum Anthemidis, Extractum Gentianæ, Extractum Glycyrrhizæ, Extractum Hæmatoxyli, Extractum Krameriæ, Extractum Opii, and Extractum Quassiæ.

3. A third group is formed in a similar manner, except that the active matters are extracted by means of rectified or of dilute spirit, in place of water. This group consists of Extractum Calumbæ (proof-spirit), Extractum Cannabis Indicæ (rectified spirit), Extractum Colocynthidis Compositum (proof-spirit), Extractum Jalapæ (first spirit, then cold water), Extractum Humuli (spirit, then by boiling in water), Extractum Nucis Vomicæ (rectified spirit), Extractum Rhei (spirit and water), and Extractum Stramonii (proof-spirit).

4. In the British Pharmacopœia liquid extracts are introduced ; these preparations are made for the most part by macerating the drug in a large quantity of cold water, and extracting by this means such of the active matter as is soluble in this menstruum ; afterwards evaporating the watery infusion, and, lastly, adding sufficient spirit to prevent decomposition.

In the Pharmacopœia the following liquid extracts are found : Extractum Cinchonæ Flavæ Liquidum, Extractum Ergotæ Liquidum, Extractum Filicis Liquidum, Extractum Opii Liquidum, Extractum Pareiræ Liquidum, Extractum Sarzæ Liquidum.

In the case of the liquid extracts of Bael, Ergot, and Pareira, each fluid part represents a solid part of the drug employed.

5. Ether is occasionally employed in lieu of water in the formation of the liquid extracts, especially when the drug contains much oleaginous matter. In the case of Extractum Ergotæ Liquidum it is used to free the preparation from the oil; in that of Extractum Filicis Liquidum it is employed as the solvent of the active matter.

Infusa. Infusions. There are a few points to be noticed under Infusions.

In the preparation of the majority of them, boiling distilled water is ordered, the time of infusing varying from ten minutes to two hours, according to the solubility of the active ingredients of the drugs; in some few cases, as in those of the infusions of Chiretta and Cusparia, water at 120° Fah. is made use of; and in others, as the infusions of Calumba, Gentian, and Quassia, cold distilled water is employed. In the case of calumba the use of cold water is of advantage, as the starch is not dissolved, and hence the infusion will keep much longer, and will not strike a blue colour in the presence of free iodine.

In making Infusum Gentianæ Compositum, a different method of procedure is adopted. A little proof-spirit is first poured upon the dry ingredients, and, after maceration, cold water is added, and the process continued as with other infusions.

Linimenta. Liniments, Embrocations. A liniment, derived from linio, I anoint, implies strictly a preparation capable of being used in anointing, and therefore of an oily or soapy nature. In the British Pharmacopœia the word is employed in a more extended sense, and includes most of the liquid pharmaceutic preparations which are employed as external remedies, and either rubbed or *painted* upon the part.

The majority of the liniments contain either a fixed or volatile oil or soap, camphor being regarded as a concrete volatile oil; the exceptions are Linimentum Cantharidis and Linimentum Iodi; both of which, unless united with other liniments or oily substances, are best used as paints, for producing blistering or powerful counter-irritation.

Liquores. Solutions. These preparations are watery solutions, either of inorganic substances or of certain definite active organic principles, and should not be confused either with juices of

plants (*succi*), or with liquid extracts: this error is frequently made.

It is important to remember certain points in regard to these preparations.

When made by the solution of a salt or alkaloid, the strength is such that four grains of the active principle are contained in one fluid ounce of the preparation; this is the case with Liquor Arsenicalis, Liquor Atropiæ, Liquor Morphiæ Hydrochloratis, Liquor Potassæ Permanganatis, Liquor Sodæ Arseniatis, and Liquor Strychniæ. It must be remembered that Liquor Morphiæ Hydrochloratis is only half the strength of the preparation in the London Pharmacopœia; also, that Liquor Ammoniæ Acetatis is five times stronger.

Spiritus. Spirits. Many of the spirits of the British Pharmacopœia differ greatly from the preparations bearing the same name in the London Pharmacopœia. Those made with volatile oils have now a uniform strength, containing one fluid part of the oil to nine fluid parts of rectified spirit. Of this composition are Spiritus Cajuputi, Spiritus Camphoræ, Spiritus Juniperi, Spiritus Lavandulæ, Spiritus Menthæ Piperitæ, Spiritus Myristicæ, and Spiritus Rosmarini. The above compounds are the same as the essences of the last Dublin Pharmacopœia.

Spiritus Chloroformi contains only one fluid part of chloroform to nineteen fluid parts of rectified spirit, and is the correct name for the so-called chloric ether, a preparation which varies so much in strength at different establishments.

Spiritus Ætheris is the old compound spirits of ether, with the omission of the oil of wine.

Spiritus Juniperi contains about ninety-five times, Spiritus Menthæ Piperitæ forty-seven times, and Spiritus Rosmarini thirty-one times, as much volatile oil as the corresponding preparations of the London College.

Succi. Juices. These preparations have been for some time used in medicine, and three are now made officinal: Succus Conii, Succus Scoparii, and Succus Taraxaci. In each instance the expressed juice of the plant has one-third of its volume of rectified spirit added, a quantity found sufficient to preserve it from decomposition. The strength of these juices is liable to vary from the influence of situation, soil, and season upon the plant.

Suppositoria. Suppositories. Preparations newly introduced for the local application of certain drugs; they are two only in number, namely, tannic acid and morphia; these agents are ordered to be made up with sugar or glycerine, lard, and soap, divided into cones, and then coated with a thin covering of wax.

[Suppositories are not officinal in the U. S. Pharmacopœia. They are best made with butter of cacao in the form of small cylinders, and introduced by means of a suppository syringe.]

Tincturæ. Tinctures. In the British Pharmacopœia this group is very extensive, and it will be observed that in the preparation of the various tinctures, different menstrua are employed, as rectified spirit, proof spirit, compound spirit of ammonia, and spirit of ether.

Rectified Spirit is used whenever the active portion of the drug from which the tincture is made is of sparing solubility in more dilute alcohol. This is the case with some alkaloids, resinous, and oily matters.

In the Pharmacopœia, rectified spirit is used in the tinctures of Aconite, Arnica, Assafœtida, Benzoin, Indian Hemp, Capsicum, Castor, Perchloride of Iron, Iodine, Kino, Lavender, Myrrh, Nux Vomica, Tolu, and Ginger. Aromatic Spirit of Ammonia is employed pharmaceutically with the same object as rectified spirit, namely, to dissolve resins and oily substances, but it is also used with a view to its own medicinal powers; its alkaline properties render it a potent solvent of resinous acids. It is only ordered for two tinctures, viz., Tinctura Guaiaci Ammoniata and Tinctura Valerianæ Ammoniata.

Spirit of Ether (a mixture of two parts by volume of rectified spirit and one part of ether) is used to form one tincture, Tinctura Lobeliæ Ætherea, and in this instance the antispasmodic virtues of the ether, rather than its solvent powers, have doubtless led to its employment.

Proof Spirit is used in making the remainder of the tinctures, containing matters partly soluble in water, partly in spirit; the amount of alcohol in proof spirit is more than sufficient to ensure an absence of all decomposition in the preparations, even when kept for a lengthened period.

Many of the tinctures made with rectified spirit, or with aro-

matic spirit of ammonia, become milky when added to water, on account of the precipitation of the resinous or oily matters which are insoluble in water, and a species of emulsion is thus formed. Under these circumstances it is often desirable to have mucilage of acacia rubbed up with the tincture before the addition of the water, and by this means the insoluble matters are held in suspension for a long time.

Trochisci. Lozenges. This group, although long officinal in the Edinburgh, is now for the first time introduced into an English Pharmacopœia. There are six different lozenges; viz., of Tannic Acid, Bismuth, Catechu, Morphia, Morphia with Ipecacuanha, and Opium. In all cases the lozenge mass is ordered to be divided into a given number (720) of lozenges, and hence a definite quantity of the active matters is contained in each.

Unguenta. Ointments. It will be observed that cerates are altogether omitted from the Pharmacopœia, but many of the present ointments contain wax, and are similar in character and composition to preparations formerly termed cerates.

In the ointments of the active principles of vegetables, as of Aconitia, Atropia, and Veratria, eight grains of the active principle are contained in about an ounce of the preparation.

Vina. Wines. In these preparations sherry wine is used as the menstruum. Vinum Ferri is now made by dissolving tartarated iron in sherry, and Vinum Opii by digesting opium in the same; in the London Pharmacopœia iron wire was employed for the former, and extract of opium for the latter preparation.

Attention to the following directions may prove of some value.

Care must be taken that medicines do not acquire any impurity from the material of the vessels in which they are either prepared or kept; therefore, unless otherwise ordered, glass, or vitrified ware, such as porcelain or stone, whose surface is not glazed with lead, should be employed.

All acid, alkaline, or metallic preparations, and salts of every kind, should be kept in stoppered glass bottles, and occasionally those made of green or black glass are desirable.

When the saturation of acids or alkalies is ordered, it is sup-

posed that this is determined by the use of litmus or turmeric papers. In applying tests, distilled water should be made use of; and, unless otherwise ordered, white bibulous paper should be used.

In the filtration of liquids, or drying of crystals, degrees of heat are measured by Fahrenheit's thermometer: boiling heat is 212°; a gentle heat between 90° and 100°. Specific gravities are to be taken at the temperature of 60°. In ascertaining the weight of any precipitate, the precipitant should be added in excess, and the precipitate well washed, and afterwards dried at 212°; care, however, is sometimes necessary, in order that the precipitate be not redissolved by the excess of the precipitant.

Crucibles should be made of Hessian or Cornish ware.

Exposure to hot water, or the vapour of boiling water, in a proper vessel, constitutes a *Water Bath.*

A *Sand Bath* consists of sand heated in a suitable vessel.

MATERIA MEDICA.

INORGANIC SUBSTANCES.

OXYGEN.

(O. Eq.=8.)

Oxygen is a colourless and odourless gas; it forms, on an average, 20·81 per cent. by measure, or 23·01 per cent. by weight, of atmospheric air. The specific gravity is 1·1057, the specific gravity of air being 1. It combines in various proportions with nearly all the elementary substances, and is the great supporter of combustion and respiration. In combination with hydrogen it forms water.

Oxygen may be prepared in various ways; when large quantities are required it is generally obtained by the action of heat on peroxide of manganese, $3\ MnO_2 = MnO,\ Mn_2O_3 + 2\ O$, pure oxide of manganese yielding about one-ninth of its weight of oxygen. Chlorate of potash may be used for the same purpose, and the decomposition is then as follows: $KO,ClO_5 = KCl + 6\ O$.

A peculiar modification of oxygen, known as Ozone, is produced under certain circumstances, as when a succession of electric sparks is passed through air, or through oxygen, a large portion of the oxygen is converted into ozone, which has a peculiar odour, is much denser than oxygen, and seems to be a more active form of this gas; it can be formed by other means, and in the course of the slow oxidation of phosphorous and other substances, is produced in small quantities.

It is a powerful oxidising agent; it displaces iodine from its metallic combinations; starch paper impregnated with a solution of iodide of potassium is generally used to detect its presence in the atmosphere, the iodine being set free combines with the starch

to form the blue iodide ; it converts the protosalts of manganese into persalts, and the sulphite of lead into sulphate.

Therapeutics. A solution of oxygen in water has been used as a slight stimulant and excitant. Considerable advantages were at first anticipated from the introduction of the gas as a remedial agent, but clinical experience has not confirmed these anticipations. Its inhalation, which has been tried in certain states of the system accompanied with deficient aëration of the blood, has not been attended with much success.

NITROGEN.

(N. Eq.=14.)

Nitrogen constitutes 79·19 per cent. of the atmosphere by measure, or 76·99 by weight. Sp. gr. 0·9713. It seems to act the part of a diluent in the air, counteracting the too stimulating properties of oxygen. Nitrogen forms acids with three and five equivalents of oxygen (NO_3 and NO_5) ; the salts known as the nitrites and the nitrates, especially the latter, are much used in medicine. With hydrogen it forms ammonia, with carbon it forms cyanogen, and enters into the composition of all the alkaloids, and many of the other most active medicinal principles, as morphia, quinia, and prussic acid. Water at the ordinary temperature dissolves about $\frac{1}{50}$th of its bulk of nitrogen. It is rarely or never employed in its free state as a therapeutic agent.

HYDROGEN.

(H. Eq.=1.)

Hydrogen is a colourless inodorous gas, which has never been liquefied, and is but slightly soluble in water. It is the lightest form of matter known, and has a sp. gr. 0·0692. In combination with one equivalent of oxygen it forms water, and with two equivalents the peroxide of hydrogen (HO_2). The latter is a liquid of syrupy consistence, and is a very unstable compound ; it possesses powerful oxidising properties, bleaches a solution of litmus, and has a somewhat metallic taste.

Therapeutics. Hydrogen possesses but little value as a remedial agent. When mixed with a certain quantity of oxygen and breathed, it imparts a peculiar shrill and sharp tone to the voice. The peroxide of hydrogen whitens the epidermis and epithelium

of the tongue, and is supposed to possess some stimulant and disinfecting action upon the system, but further investigations are required to establish its value as a medicine.

CARBON.

(C. Eq.=6.)

An elementary body found pure, or almost so, in the diamond, plumbago, and anthracite; combined with other elements, it enters into almost all vegetable and animal substances. In medicine it is now only employed in the form of charcoal, of which there are two varieties, vegetable and animal.

Carbo Ligni. Wood Charcoal.

Wood charred by exposure to a red heat without access of air.

Prep. Obtained by burning wood with a limited supply of air, by which the hydrogen, etc., are burnt off, and the carbon remains. Wood yields from seventeen to twenty-three per cent. It is met with either in the form of the pieces of wood from which it was made, or as a black powder.

Prop. & Com. It is odourless and almost tasteless; it possesses the power of absorbing gases and odours to a great extent, especially when recently prepared; besides carbon, it contains some salts, about two per cent. It is insoluble in water, and in close vessels is neither melted nor volatilized by the most intense heat.

Off. Prep. Cataplasma Carbonis, Charcoal Poultice. (Wood charcoal, in powder, half an ounce; bread, two ounces; linseed meal, one ounce and a half; boiling water, ten fluid ounces. Mix the water, bread, and linseed; then add half the charcoal, and sprinkle the remainder on the surface.)

Therapeutics. It has been employed on account of its absorbing power, as an antiseptic and corrector of acidity and flatus of the stomach and intestines, and to correct the state of the fæces in some diseases. As an external application it is used in the form of poultice, to prevent the fœtor of ulcers, etc. Dr. Stenhouse has recently proposed its being used in the manufacture of respirators for those who are subjected to the influence of injurious gases or vapours. Internally it is given in certain forms of dyspepsia, accompanied with flatus and acidity.

Dose. Internally from a teaspoonful to a tablespoonful, recently

made, and carefully preserved in stoppered vessels. It is sometimes made into a biscuit and thus employed; sometimes also it is given in the form of lozenges.

Bone Black.

Ivory Black, Animal Charcoal, Appendix A. The residue of ox and sheep bones which have been exposed to a red heat without the access of air, reduced to powder: it contains about 10 per cent. of carbon, the remaining 90 per cent. consisting of phosphate, with a little carbonate, of lime.

Carbo Animalis Purificatus. Purified Animal Charcoal.

Bone black, deprived of its earthy salts.

Prep. It is prepared by treating bone black with very dilute hydrochloric acid, to remove all the salts; then washing and drying, and afterwards heating to redness in a covered crucible.

Prop. & Comp. Inodorous and almost tasteless; absorbs gases and odours, and has also great power in abstracting almost all principles from their solutions, such as alkaloids, bitter and colouring matters, etc.

Therapeutics. Animal charcoal may be used in the same way and for the same purposes as vegetable, in addition to which the author has shown that its antidotal power against vegetable poisons is very great, rendering inert opium, nux vomica, aconite, and almost all the active organic poisons. In pharmacy it is used to deprive alkaloids and other principles of their colour, etc.

Dose. As an antacid and corrector of fœtor, from a teaspoonful to a tablespoonful; as an antidote, from half an ounce to two ounces or more, according to the amount of poison taken; it may be suspended in water for a short time, and thus administered. Common bone black in the state of fine powder may be used as an antidote or externally applied; it is much more powerful than the purified charcoal, if estimated by the amount of contained carbon.

SULPHUR.

(S. Eq.=16.)

An elementary body found native as virgin sulphur; also in combination, as sulphurets of metals, etc.

Sulphur Sublimatum. [U. S.] Sublimed Sulphur; Flowers of Sulphur.

[**Sulphur Lotum.** Washed Sulphur. U. S.]

Sulphur Præcipitatum. Precipitated Sulphur; Lac Sulphuris.

Prep. *Sublimed* sulphur is generally prepared from the virgin sulphur, by causing it to rise in vapours, which are condensed in a chamber. It may also be made from any metallic sulphuret, but is then more liable to contain impurities, as arsenic, etc. The *precipitated* sulphur is directed in the Pharmacopœia to be prepared by first forming a sulphuret of calcium, by heating sulphur and lime with water, then causing the precipitation of the sulphur by means of hydrochloric acid, and washing the product with distilled water until the washings cease to have an acid re-action or precipitate with oxalate of ammonia; showing that the acid and lime have been removed. The sulphur should be dried at a temperature not exceeding 120°.

Prop. & Comp. *Sublimed* sulphur is a citron or bright yellow coloured powder, without taste and odour, sp. gr. 1·98, which rises in vapour at 600° Fah., it is soluble in hot oil of turpentine and bi-sulphuret of carbon, and to a small extent in oils. It burns with a blue flame, and the evolution of sulphurous acid. *Precipitated* sulphur forms a pale yellow powder; in other respects resembles sublimed sulphur. Neither should give an acid reaction to water. The composition of both kinds of sulphur is the same. When heated to a certain point sulphur assumes a peculiar viscid condition.

Off. Prep. Of sublimed sulphur.

Confectio Sulphuris. Confection of Sulphur. (Sublimed sulphur, four ounces; acid tartrate of potash, in powder, one ounce; syrup of orange peel, four fluid ounces.)

Unguentum Sulphuris. Ointment of Sulphur. (Sublimed sulphur, one ounce; prepared lard, four ounces.) [Sublimed sulphur, one troy ounce; lard, two troy ounces; mix them. U. S.]

Therapeutics. In small doses sulphur is absorbed and then acts as a stimulant to the skin and different mucous membranes, passing off as sulphuretted hydrogen from the skin, becoming partly oxidised, and increasing the amount of sulphuric acid in the urine. In larger doses it produces a laxative or very mild purgative effect upon the bowels. Externally it is a slight stimulant, and has the power of destroying the acarus scabiei or itch insect. It is given as a stimulant in chronic cutaneous affections, chronic

bronchitis, and rheumatism; as a laxative to children and delicate persons; also in diseases of the rectum, as piles. Externally it is applied as an ointment in skin affections, especially scabies.

Dose. Of either form of Sulphur. As a stimulant, from 10 gr. upwards. As a laxative, 30 gr. to 60 gr. or more. Of confection, 20 gr. to 120 gr. Formerly sulphur, dissolved in olive oil, and called balsam of sulphur, was a favourite remedy.

Adulteration. Sublimed sulphur may contain a trace of sulphurous acid from oxidation during sublimation; it should, however, be free from this, and not redden moistened litmus paper; and a solution of ammonia which has been agitated with it should not leave any residue; when washed it is called *sulphur lotum.* The precipitated sulphur contains sometimes from 50 to 70 per cent. of sulphate of lime, arising from sulphuric acid being occasionally used to precipitate it; this impurity can be detected by its not subliming with heat; sublimed sulphur when pure does not show any crystals under the microscope, but simply opaque globules.

PHOSPHORUS.

(P. Eq.=31.)

Phosphorus. (Appendix.) Phosphorus.

Prep. From phosphoric acid or superphosphate of lime (made by acting upon bone ashes with oil of vitriol) by distillation with charcoal, when carbonic acid is formed and phosphorus set free, which sublimes.

Prop. & Comp. A waxy-looking substance, usually in the form of pipes, from being cast into moulds, almost colourless and transparent when fresh, luminous in the dark, from oxidating and forming phosphorus acid (PO_3), very easily inflamed; sp. gr. 1·77; melts at 108° Fah.; insoluble in water; soluble in ether, oils, and true naphtha; entirely soluble in boiling oil of turpentine and bisulphide of carbon. When burnt, forms phosphoric acid (PO_5); becomes opaque and reddish on the surface when old, from the formation of a suboxide, to prevent which it should be kept in water and in the dark. Phosphorus also exists in a peculiar allotropic condition, known as amorphous or red phosphorus, in the form of a red powder, which may be exposed to the air without giving off any fumes, and may be heated in the open air till

the temperature reaches 500°, at which point it takes fire, etc. This variety is not soluble in bisulphide of carbon.

Therapeutics. Very seldom given internally; it is said to act as a powerful stimulant and aphrodisiac, producing considerable gastro-intestinal irritation and other dangerous effects in large doses; it has been employed on the Continent in low fevers, cholera, etc., and in this country in the treatment of phthisis. The fumes of phosphorus produce on individuals exposed to them for a lengthened period, a peculiar disease of the jaw-bone, probably from phosphorus acid being present.

Dose. Gr. $\frac{1}{40}$ to gr. $\frac{1}{10}$ dissolved in ether or olive oil. Phosphorus is introduced for the preparation of phosphoric acid.

IODINE.

(I. Eq. = 127.)

Iodum Purificatum. Purified Iodine. [Iodinium, Iodine. U.S.]

Iodine, in crystals (so named from ἰωδης, violet).

Prep. Iodine is prepared from kelp, the vitrified ashes of seawrack, found in the Western Islands, north of Scotland and Ireland; from the solution of this substance, after the crystallization of most of the salts, as the carbonate of soda, &c., a liquor remains, containing the iodides of sodium, potassium, and magnesium; this, when treated with sulphuric acid and binoxide of manganese, yields iodine, which sublimes, and is collected in receivers; by means of the peroxide of manganese oxygen is set free and replaces the iodine; if we suppose one equivalent of iodide of sodium to be acted on by one of binoxide of manganese and two of sulphuric acid, the formula representing the changes is as follows:

$$(Na\ I + Mn\ O_2 + 2\ SO_3 = Na\ O, SO_3 + Mn\ O, SO_3 + I).$$

Prop. & Comp. Black scales, or laminar crystals, with metallic lustre, sp. gr. 4·95, odour similar to chlorine, melts when heated, then sublimes in a beautiful violet vapour, soluble in rectified spirits and ether, but slightly so in pure water, about $\frac{1}{7000}$ part, much more soluble in a watery solution of iodide of potassium and chloride of sodium. The aqueous solutions precipitate

starch of a dark-blue colour. In free alkaline solutions iodine dissolves and forms salts.

Off. Prep. Linimentum Iodi. Liniment of Iodine. (Iodine, one ounce and a quarter; iodide of potassium, half an ounce; rectified spirit, five fluid ounces.)

[Liquor Iodinii Compositus. Compound Solution of Iodine. Lugol's Solution of Iodine. Iodine, 360 grains; iodide of potassium, 720 grains; distilled water, a pint.]

Tinctura Iodi. Tincture of Iodine. (Iodine, half an ounce; iodide of potassium, a quarter of an ounce; rectified spirit, twenty fluid ounces.)

[Tinctura Iodini. Tincture of Iodine. Iodine, a troy ounce; alcohol, a pint. U. S.]

[Tinctura Iodinii Composita. Compound Tincture of Iodine. Iodine, half a troy ounce; iodide of potassium, a troy ounce; alcohol, a pint. U. S.]

Unguentum Iodi Compositum. Compound Ointment of Iodine. (Iodine, thirty-two grains; iodide of potassium, thirty-two grains; proof spirit, one fluid drachm; prepared lard, two ounces.)

[Unguentum Iodinii. Ointment of Iodine. Iodine, twenty grains; iodide of potassium, four grains; water, six minims; lard, a troy ounce. U. S.]

[Unguentum Iodinii Compositum. Compound Ointment of Iodine. Iodine, fifteen grains; iodide of potassium, thirty grains; water, thirty minims; lard, a troy ounce. U. S.]

Therapeutics. When applied externally, free iodine acts as an irritant, or vesicant, according to the mode of using it; and when rubbed in for some time, it is absorbed, and influences the neighbouring parts, and also the system at large: when the diluted vapour is inhaled, it acts topically on the mucous membranes of the respiratory passages. Internally, free iodine produces irritation of the mucous membrane of the alimentary canal, causing, in large doses, heat and pain at the epigastrium, and vomiting; and, when the full influence of iodine upon the system is desirable, the drug is usually given in combination, more especially as iodide of potassium, which produces but little local irritation. Iodine is rapidly absorbed into the blood, and can be detected in many of the fluids soon after administration, especially in the urine; the

constitutional effects produced are increased activity of most of the secreting and excreting organs, as the kidneys, mucous membranes, and skin; it also powerfully influences the glandular and absorbent systems, as seen when such parts are enlarged, as in bronchocele, and in scrofulous glands of the neck and abdomen. It is stated occasionally to cause the wasting of even healthy glands, as the breasts and testes; it has a powerful alterative action, as exhibited in its influence over scrofulous affections and secondary syphilitic disease. When given in large medicinal doses, the mucous membrane of the nose, frontal sinus, eyes, pharynx, &c., often become irritated, and catarrhal symptoms, coryza, &c., are induced; occasionally much depression ensues from its administration, accompanied by a low febrile state of system.

Iodine or iodide of potassium is administered in very many diseases, as the different forms of scrofula, in bronchocele and other glandular enlargements, in hypertrophy and induration, of organs or other structures, produced by inflammation, as in hypertrophy of the spleen, liver, or uterus, in nodes, &c.; in chronic skin affections, syphilitic or not; for the relief of other secondary or tertiary symptoms, and also in chronic rheumatism; in dropsies as a diuretic; in some forms of amenorrhœa, as an emmenagogue; and in various obstinate mucous discharges, as leucorrhœa, as an alterative.

Externally iodine is used in chronic skin diseases and over enlarged and indurated parts and diseased joints, to alter action or cause absorption; for this purpose it may be applied in the form of the liniment, tincture, or ointment. As a speedy vesicant, the liniment may be painted over the part two or three times; one application, however, is often sufficient. A few drops of the tincture, put into half a pint of hot water, may be used as an inhalation in some forms of chronic bronchitis and phthisis.

Dose. Of iodine (free) ½ gr., gradually increased; of tinct. iodi., 5 to 20 minims; of iodide of potassium, *vide* Potassii Iodidum. [The compound tincture of iodine, U. S., may be given in doses of from 10 to 30 drops, largely diluted, and repeated two or three times a day. The compound solution, 5 to 15 minims in water three times a day.]

Adulteration. Water is often present, also iodide of cyanogen;

besides these, fixed impurities, as plumbago, black oxide of manganese, charcoal, iron, &c. The first two are volatile; water can be detected by finding whether bibulous paper is moistened by the iodine; iodide of cyanogen by distilling at a very low temperature, when this body sublimes, if present, in white crystalline needles before the iodine; the fixed impurities are left after sublimation. The Pharmacopœia gives the following quantitative test: 12·7 grains, dissolved in an ounce of water containing 15 grains of iodide of potassium, require for complete decoloration 100 measures of the volumetric solution of hyposulphite of soda. In this process, iodide of sodium (Na I), which is colourless, and also tetrathionate of soda (Na O, S_4 O_5), are formed. The following formula will serve to illustrate the changes which ensue, 2 (Na O, S_2 O_2) + I=Na I, + Na O, S_4 O_5; the amount of iodine can thus be estimated, 100 measures of the volumetric solution corresponding to 12·7 grains of iodine.

Sulphuris Iodidum. Iodide of Sulphur. (Not officinal.) [Officinal. U. S.]

Prep. (Sulphur, one ounce; iodine, four ounces. Put the sulphur in a glass vessel, and place on it the iodine; hold the vessel immersed in boiling water until they have united; afterwards, when cool, the vessel being broken, break the iodide into fragments, and keep in a well-stoppered vessel.)

Prop. & Comp. A bluish black crystalline metallic-looking substance, not unlike sulphuret of antimony in appearance, having the odour of iodine, it stains the skin yellow, is decomposed by boiling in water, and, if properly prepared, should give, when so boiled, 20 per cent. residue of sulphur. Composition (IS_2) or a bisulphuret of iodine.

Therapeutics. Applied externally in the form of an ointment of the strength of about thirty grains of the salt to an ounce of lard, it acts in a manner very similar to iodine, and has been employed in some obstinate chronic skin diseases, as lepra, porrigo, acne indurata, &c. Internally it possesses no particular value, but has been given as an alterative.

Dose. Half gr. to 3 gr. or more.

BROMINE.

(Br. Eq.=80.)

Bromine, Appendix A. [Brominium. U. S.] (so named from

βρωμος, a stench). An elementary body contained in combination with metals in sea water, sea plants, &c.

Prep. From bittern, the liquor left from sea water, after the crystallization of common salt; it is present as bromide of magnesium, and can be obtained by passing a current of chlorine gas through the liquor, which unites with the magnesium, and liberates the bromine; this is often taken up by shaking with ether, which dissolves the bromine, and rises with it to the surface. Subsequent purification is required, usually effected by converting the bromine into bromide of potassium, and again liberating the bromine by means of bin-oxide of manganese and sulphuric acid.

Prop. & Comp. A dark brownish-red liquid by reflected, but hyacinth-red by transmitted light through thin layers; of an intensely disagreeable acrid odour and taste, very volatile, and fumes when exposed to the air; sp. gr. 2·966; soluble in ether, alcohol, and slightly in water; soluble in alkaline solutions, forming salts; precipitates starch of an orange colour.

Therapeutics. Bromine is never administered in its free state, most commonly as bromide of potassium, occasionally as bromide of ammonium and of iron; the effects of these salts are described under the head of their bases.

Adulteration. Bromine sometimes contains iodine. Agitated with a solution of soda, in such proportion that the fluid remains very slightly alkaline, it forms a colourless liquid, which, if coloured by the addition of a small quantity of chlorine, should not become blue on the subsequent addition of starch.

CHLORINE.

(Cl. Eq.=35·5.)

Free chlorine occurs in the form of a greenish-coloured gas, having a peculiar acrid odour, very soluble in water, especially when cold; it possesses intense chemical powers, bleaches all vegetable colours, and acts as a powerful disinfectant, probably by decomposing the organic particles producing diseases. For this purpose it can be evolved from chlorated lime by the addition of some acid, or more economically by the following method:—Mix one part of common salt and one part of bin-oxide of manganese intimately together, and add to these (put into a shallow dish) two

parts by weight of oil of vitriol previously diluted with two parts of water; such a mixture will continue to give off chlorine for some days.

Liquor Chlori. Solution of Chlorine.

Prep. (Hydrochloric acid, six fluid ounces; black oxide of manganese, in fine powder, one ounce; distilled water, thirty-four fluid ounces. Mix the acid and oxide in a retort, then pass the chlorine through an intermediate small phial, containing three ounces of water, to the bottom of a three pint bottle containing the remainder of the water, until it has almost ceased to be given off.) In this process the decompositions which take place are represented in the formula ($2\,H\,Cl + Mn\,O_2 = Mn\,Cl + 2\,HO + Cl$).

Prop. & Comp. This is a solution of chlorine gas dissolved in half its volume of water, and constituting 0·006 of the weight of the solution. It is a liquid, having a slight green colour, with a very strong odour of chlorine, and immediately discharging the colour of a dilute solution of sulphate of indigo; when exposed to the light it is decomposed, with the formation of hydrochloric acid and oxygen, and hence should be used recently prepared.

Therapeutics. Its action as a remedy resembles that of the Liquor Sodæ Chloratæ, and it may be used, when diluted about seven times with water, as a gargle or lotion; or, still more dilute, it may be given as an internal remedy in low or typhoid states of the system, as malignant scarlatina, &c.

Tests. Sp. gr. 1·003, leaves no residue on evaporation. When 20 grains of iodide of potassium, dissolved in an ounce of distilled water, are added to a fluid ounce of this preparation, the mixed solution acquires a deep red colour (from the liberation of iodine), which requires for its discharge 75 measures of the volumetric solution of hyposulphite of soda, equivalent to 2·67 grains of chlorine.

Dose. 10 min. to 30 min. freely diluted.

WATER.

Aqua. Water.

Natural water (HO), the purest that can be obtained, cleared if necessary by filtration; free from odour, taste, and visible impurity. If pure it leaves no residue when evaporated, but it is very

difficult to ensure absolute purity, on account of traces of foreign matter that are liable to be introduced from the still.

Off. Prep. Aqua Destillata. Distilled Water.

Prep. Made by distilling water in a still, rejecting the first portion.

Prop. & Comp. A limpid colourless fluid, devoid of taste and smell, not altered by the addition of lime-water, chloride of barium, nitrate of silver, oxalate of ammonia, or sulphuretted hydrogen, indicating freedom from carbonic acid or carbonates, sulphates, chlorides, and most organic matter, lime and ordinary metallic impurities, as copper, lead, &c. Composition (HO).

Use. It is ordered to be used in making almost all pharmaceutical preparations, but common water is frequently substituted; in some cases this neglect is important, as insoluble and inert compounds are formed, and the solvent power of distilled water for some substances exceeds that of common water.

MINERAL WATERS.

All water found on the earth's surface contains more or less foreign matter. The purest is melted snow or rain water, collected at a distance from towns. The most common impurities are salts of lime, as the sulphate, and the carbonate held in solution by an excess of carbonic acid. Besides these, water always contains a certain amount of gases dissolved in it, as common air, or rather air rich in oxygen and carbonic acid. The nature of the saline impurities varies much with the kind of soil through which the water flows; for some substances, as silex, are almost insoluble, whereas limestone and gypsum dissolve to a considerable amount, the former especially, when the water is impregnated with carbonic acid. When these foreign matters exist in the water to an extent sufficient to impart a sensible taste, it is called a mineral water: these have been divided into four classes, depending on their chemical composition.

The following are the most important:—

Class 1.—*Chalybeate or Ferruginous Waters.*

These waters owe their efficacy to the iron contained in them; in many waters traces of iron exist, but such only are named chalybeate as possess sufficient of this metal to endow them with decided

medicinal powers. In some springs, the iron exists in the form of carbonate held in suspension by excess of carbonic acid; when such are exposed to the air, peroxide of iron is soon formed and deposited: others contain sulphate of iron, often associated with sulphate of alumina, sometimes with chloride of iron.

The most important chalybeate waters, in which carbonate of iron is found, are those of Pyrmont, Spa, Schwalbach, Tunbridge Wells, and Harrowgate.

Iron exists as a sulphate in the waters of Sand Rock Isle of Wight, Brighton, &c.

Therapeutics. Chalybeate waters are useful in anæmic conditions of the system; those containing the carbonate of iron are generally preferred, agreeing better with the stomach, and being less astringent. Individuals of plethoric habits should avoid chalybeate waters.

Class 2.—*Acidulous or Carbonated Waters.*

These waters contain a large amount of carbonic acid, which gives them their acidity, and causes them to sparkle; they usually hold in solution carbonates of lime, soda, and magnesia, which often become deposited on exposure from the escape of the carbonic acid, which acted as the solvent. The most celebrated of these waters are those of Carlsbad, Seltzer, and Ilkestone, near Nottingham.

Therapeutics. These waters are useful in atonic forms of dyspepsia, the free carbonic acid improving the tone of the stomach; they also, from the alkaline salts they possess, act as alteratives, increasing the secretion of the kidneys and skin, and are often valuable in chronic visceral diseases, gout, rheumatism, and some calcareous affections.

Class 3.—*Saline Waters.*

These waters contain various salts, as sulphates of soda, magnesia, and lime; chlorides of sodium, calcium, and magnesium; carbonates of lime and soda, &c. Hence they may be subdivided:

Some, containing chiefly sulphates of magnesia and soda, are named *purging saline waters*, as those of Cheltenham, Leamington, Epsom, Seidlitz, and Püllna.

Some, having carbonate and sulphate of lime for their principal

ingredients, are called *calcareous waters*, as those of Buxton, Bath, and Bristol.

Others contain chiefly chlorides, with, now and then, traces of iodine and bromine, called *salt waters*, as those of Wiesbaden, Baden-Baden, and Kreutznach. Sea water also belongs to this division.

Lastly, some saline waters are noted for the amount of alkaline carbonates they contain, these are termed *alkaline waters*, as those of Vichy and Ems, &c.

Therapeutics. The purging waters are indicated in cases where congestion of the portal system is present, whether from organic visceral disease or not; the calcareous waters in chronic gout and rheumatism, and some skin affections: they act as powerful stimulants and alteratives, increasing the urinary and cutaneous excretions; the simple saline waters are more adapted for scrofulous affections, as glandular enlargements, &c.; and the alkaline waters in gout, and urinary diseases connected with excessive formation of uric acid, as they tend to induce a less acid condition of urine.

CLASS 4.—*Sulphuretted or Hepatic Waters.*

All contain sulphuretted hydrogen in solution, and are readily known by their odour; the most celebrated are those of Harrowgate, Moffat, Cheltenham, Aix-la-Chapelle, Borcet, and Aix, in Savoy: some contain an alkaline sulphuret as well as sulphuretted hydrogen.

Therapeutics. These waters act as stimulants, especially on the skin and uterine system, and are used chiefly in chronic skin diseases, certain cases of chronic rheumatism, and uterine affections, &c.

ACIDS.

ACIDS EMPLOYED IN MEDICINE OR FOR TESTS, ARRANGED ALPHABETICALLY.

Acidum Aceticum. Acetic Acid. An acid liquid, prepared from wood by destructive distillation, and containing 28 per cent. of anhydrous acetic acid.

Prep. When wood is heated in close vessels, as in iron retorts, amongst the volatile products of its destruction, a large amount of acetic acid distils over, mixed with wood spirit and various hydrocarbons; from this fluid, after redistillation, and neutralization

with carbonate of soda, acetate of soda is separated by crystallization, and purified by several re-crystallizations; this salt heated with sulphuric acid and water yields acetic acid mixed with water, and forms the product under consideration.

Prop. & Comp. A colourless liquid with a very pungent odour and strong acid taste, sp. gr. 1·044 [1·047. U. S.], contains 28 per cent. of anhydrous acetic acid ($C_4 H_3 O_3$); is volatile, and leaves no residue when evaporated. One fluid drachm requires for neutralization 31·5 measures of the volumetric solution of soda. It gives no precipitate with chloride of barium or nitrate of silver, has no action on strips of metallic silver, and when neutralized with ammonia is not precipitated by sulphuretted hydrogen, ammonia, or ferrocyanide of potassium; these various tests indicating a freedom from sulphuric, hydrochloric, or nitric acids, and metallic impurities, especially copper: it does not give rise to a blue colour when added gradually to an equal volume of the solution of iodate of potash, previously mixed with a little mucilage of starch. This shows the absence of sulphurous acid, which, if present, would set free iodine by deoxidizing the iodate, and the blue iodide of starch would be formed.

Off. Prep. Acidum Aceticum Dilutum. Dilute Acetic Acid. (Acetic acid, twenty fluid ounces; distilled water, one hundred and forty fluid ounces.)

The sp. gr. is 1·006. One fluid ounce requires for neutralization thirty-one measures of the volumetric solution of soda. It contains 3½ per cent. of anhydrous acetic acid.

Oxymel. Oxymel. [Not officinal in U. S. P.] (Clarified honey, forty ounces; acetic acid, five fluid ounces; distilled water, five fluid ounces.)

Therapeutics. When freely diluted, acetic acid, given internally, acts as a refrigerant, but is seldom employed for this purpose. Externally, in its strong form, it is used as a rubefacient; sometimes as a vesicant and escharotic; but the glacial acid is more effective for such purposes; much diluted, it may be used to sponge the surface in fevers, also in cooling lotions. Acetic acid is more frequently employed on account of its solvent powers, than for any therapeutic value it may possess, as in Linimentum Cantharidis.

Dose. Of acidum aceticum dilutum, 1 fl. drm. to 3 fl. drm. diluted still more. Of oxymel 1 fl. drm. to ½ fl. oz.

Adulteration. Foreign acids and metallic impurities, as copper, detected by the above tests.

Acidum Aceticum Glaciale. Glacial Acetic Acid. [Not officinal in U. S. P.]

Synonym. Acidum Aceticum. *Edin.* Monohydrated Acetic Acid.

Prep. This is prepared by distilling acetate of soda, from which the water has been expelled by heat, with sulphuric acid, by which means sulphate of soda is formed, and acetic acid distils over. If the product contains any sulphurous acid, when tried by the iodate of potash and starch test mentioned above, it is shaken with black oxide of manganese and redistilled. Any sulphurous acid is thus converted into sulphuric acid, and remains in combination with the manganese.

Prop. & Comp. A colourless liquid, converted when cooled to nearly 32° into colourless prismatic crystals. Composition HO, $C_4 H_3 O_3$, or an acetate of water. Sp. gr. 1·065, which is increased by adding 10 per cent. of water. Dilution increases the density of acetic acid until nearly one-third of its weight of water has been added, when it contains HO, $C_4 H_3 O_3 + 2$ Aq. On further dilution, the density diminishes in the usual manner. In consequence of this anomaly, the density alone cannot be relied on as a test for the strength of acetic acid, as between 1·063 and 1·077 the same density may indicate two very different strengths; monohydrated acetic acid and the same acid diluted with an equal weight of water having both the sp. gr. 1·063. A fluid drachm of glacial acetic acid requires for neutralization 97 measures of the volumetric solution of soda. The absence of sulphurous acid is indicated by the iodate of potash and starch test.

Off. Prep. It is used in the preparation of Mistura Creasoti.

Therapeutics. Glacial acetic acid acts as a caustic irritant, vesicant, and escharotic. It is chiefly used as an external application; but diluted with water may be used for the same purposes as dilute acetic acid.

Acetum. Vinegar (French). Impure dilute acetic acid, prepared from French wines by the acetous fermentation. [Prepared by fermentation. U. S.]

Prep. The alcohol contained in the wine, under certain conditions, absorbs oxygen, and is converted into acetic acid, which is

contained in the vinegar. The change is thus shown: alcohol ($C_4 H_6 O_2$) + O_4 = acetic acid (HO, $C_4 H_3 O_3$) + 2 HO.

Prop. & Comp. A liquid of a straw colour, having an agreeable acid odour and taste; sp. gr. from 1·008 to 1·022. It is a little stronger than British vinegar, about one-sixth, and when ammonia is added in excess to it, some turbidity is usually produced, and a purple colour, due to the development of the colouring matter of the wine. British vinegar, which was formerly officinal, contains about 5 per cent. of real acid, together with colouring matter, mucilage, and a small amount, $\frac{1}{1000}$ part by weight, allowed by law, of sulphuric acid.

Therapeutics. The action of vinegar is the same as that of dilute acetic acid of equal strength.

Dose. Of acetum 1 fl. drm. to 3 fl. drm. diluted.

Adulteration. Sulphuric acid may be added to vinegar, and metallic impurities may be present from the vessel in which it is kept. It should be scarcely affected by chloride of barium, or oxalate of ammonia, and not at all by sulphuretted hydrogen.

Acidum Arseniosum. Vide Preparations of Arsenic.

Boracic Acid. Appendix B.

Prop. & Comp. It occurs in pearly scales, is efflorescent, and fuses at a red heat. It is sparingly soluble in cold, but is soluble in three times its weight of boiling water. Soluble in alcohol, the solution burning with a green flame. The composition is BO_3 + 3 HO. The element boron resembles carbon in many of its properties, and has an equivalent of 10·9, and is represented by the symbol B.

Use. Boracic acid is used for making a solution for qualitative analysis, it is not given as a medicine, except in the form of borax, or biborate of soda.

Acidum Benzoicum. Vide Gum Benzoin.

Acidum Carbonicum. (Not officinal.) Carbonic Acid. (Solution in water.) Aërated water.

Prep. By acting upon carbonate of lime, as chalk, marble, &c., with dilute sulphuric acid, and passing the gas through water under pressure.

Prop. & Comp. Carbonic acid (CO_2) is a colourless gas, heav-

ier than air, soluble in its own volume of water; the solubility much increased by pressure. The solution is acid in re-action, sparkling when exposed to air from the escape of the gas. Water containing this acid has the power of holding in solution carbonates of magnesia, lime, iron, &c.

Therapeutics. The gas, when existing in quantities above a very small amount in the air, acts as a narcotic poison, causing asphyxia; and directed in a stream upon a painful ulcerated surface, is stated to allay the pain. When taken in the stomach, aërated water diminishes irritability if present, and hence allays sickness; and carbonic acid is often given in the form of effervescing medicines made with an acid and bicarbonate of an alkali. The water may also be usefully employed in dissolving saline remedies, as phosphates, carbonates of potash, soda, and lithia, &c., when it is desirable to continue their use for a lengthened period.

Much of such water is now prepared in the Gasogene apparatus, of English and French construction.

Acidum Citricum. Citric Acid. An acid obtained from lemon juice, or the juice of the fruit of Citrus Limetta, the Lime.

Prep. From the juice of lemons, limes, and other allied species, by first fermenting the juice with yeast, in order to get rid of the sugar, and then neutralizing the acid with chalk, to form a citrate of lime, purifying this and liberating the citric acid by means of sulphuric acid.

Prop. & Comp. Large transparent colourless crystals, right rhombic prisms, of an agreeable acid taste, decomposed by heat, soluble in water and spirit: the precipitate formed with acetate of lead is soluble in nitric acid. Citric acid does not render lime-water turbid (citrate of lime is, however, a sparingly soluble salt), and causes no precipitate with any salts of potash except the tartrate, from which it throws down the acid or bitartrate. Composition of the crystallized salt ($3\,HO, C_{12}\,H_5\,O_{11}+HO$) or ($3\,HO, \overline{Ci}+HO$). Citric acid being regarded as tribasic, 3 equivalents of the water act the part of base. 67 grains of the crystals dissolved in water are neutralized by 100 measures of the volumetric solution of soda. It leaves no ash when burned with free access of air. The aqueous solution is not darkened by sulphuretted

hydrogen, nor precipitated by chloride of barium, showing the absence of metallic impurities and sulphates.

Therapeutics. Citric acid given internally appears to act as a refrigerant, that is, in some way or other to diminish the preternatural temperature of the body in febrile states of the system; it also allays thirst and irritation of the skin.

Dose. 10 gr. to 30 gr. or more, dissolved in water and sweetened.

Adulteration. Traces of sulphuric acid may be present, also tartaric, both detected by the tests and characters given above.

Acidum Hydrochloricum. Hydrochloric Acid. Hydrochloric acid gas dissolved in water. [Acidum Muriaticum. Muriatic Acid. An aqueous solution of hydrochloric acid gas of 1·160 sp. gr. U. S.]

Synonym. Acidum Muriaticum Purum. *Edin. Dub.*

Prep. By the action of sulphuric acid and water on chloride of sodium (common salt) in a glass retort, sulphate of soda and hydrochloric acid are formed; the latter distils over, and is collected in a receiver containing water, which absorbs the gas rapidly.

Prop. & Comp. A colourless transparent liquid, with a suffocating odour, and very sour taste, giving off white acrid fumes when exposed to air; sp. gr. 1·17; entirely dissipated by heat; it consists of hydrochloric acid (H Cl) dissolved in water. It gives with nitrate of silver a curdy white precipitate (chloride of silver), soluble in excess of ammonia, but not in nitric acid.

Hydrochloric acid has no action on gold leaf, even when boiled with it; this is shown by the acid, after digestion on the metal, not giving any precipitate with protochloride of tin; nor does the acid decolorize a solution of sulphate of indigo, indicating the absence of free chlorine. When diluted with 4 volumes of distilled water it gives no precipitate with chloride of barium or sulphuretted hydrogen, and does not tarnish bright copper foil when boiled with it, proving the absence of sulphates, and earthy or metallic matter; 1 fluid drachm requires for neutralization 60·25 measures of the volumetric solution of soda, corresponding to about 22 grains of real acid (H Cl).

Off. Prep. Acidum Hydrochloricum Dilutum. Dilute Hy-

drochloric Acid. (Hydrochloric acid, three fluid ounces; distilled water, eight fluid ounces.)

[ACIDUM MURIATICUM DILUTUM. Muriatic acid, four troy ounces; distilled water to make the diluted acid measure a pint. The sp. gr. is 1·038. U. S.]

Its sp. gr. is 1·05; six fluid drachms require for neutralization ninety-nine measures of the volumetric solution of soda, equivalent to about thirty-six grains of real acid.

ACIDUM NITRO-HYDROCHLORICUM DILUTUM. *See* Officinal Preparations of Acidum Nitricum.

Therapeutics. Externally it acts as a powerful caustic, and acrid poison. Internally, in a dilute form, as a refrigerant, tonic, and astringent. It is given in some forms of atonic dyspepsia, in low states of the system, as in the petechial form of exanthematous diseases. It is also used as a gargle in ulceration of the throat, and in diphtheria.

Dose. Of acidum hydrochloricum dilutum, 10 min. to 30 min. diluted freely.

Adulteration. Sulphuric acid, chlorine, and iron, for which the tests are given. The commercial acid is generally coloured from the presence of the latter impurities.

Acidum Hydrocyanicum Dilutum. Dilute Hydrocyanic Acid, or Prussic Acid. Hydrocyanic acid dissolved in water, and constituting 2 per cent. of the solution.

This acid contains rather more than half as much anhydrous acid as Acidum Hydrocyanicum. *Edin.*

Prep. (Ferrocyanide of potassium, two ounces and a quarter; sulphuric acid, seven fluid drachms; distilled water, thirty fluid ounces, or a sufficiency. Mix the acid with four fluid ounces of the water, and to these, placed in a retort, when they have cooled, add the ferrocyanide of potassium, first dissolved in half-a-pint of the water. Put them into a retort, and adapt this to a receiver, containing eight ounces of the water, which must be kept carefully cold. Distil with a gentle heat till the fluid in the receiver measures seventeen ounces; lastly, add three ounces or as much water as may be necessary to bring the acid to the required strength.) The changes occurring in this process are rather complex, but in

substance may be shown as follows: Ferrocyanide of potassium is a double cyanide of potassium and iron (2 K Cy + Fe Cy + 3 HO); when acted upon by sulphuric acid and water, a portion of the cyanide of potassium of the salt is decomposed into hydrocyanic acid and sulphate of potash, and a salt containing two equivalents of cyanide of iron to one of cyanide of potassium, is left in the retort, called Everitt's yellow salt; the formula for the decomposition is as follows:

$$(K_4\ Cy_4 + Fe_2\ Cy_2) + 3\ (HO, SO_3) = (Fe_2\ Cy_2 + KCy) + 3\ (KO, SO_3) + 3\ H\ Cy.$$

Anhydrous prussic acid can be prepared by passing sulphuretted hydrogen (hydrosulphuric acid) over cyanide of mercury: a sulphuret of the metal and hydrocyanic acid are then formed. Hydrocyanic acid is also produced when amygdaline, a principle contained in the bitter almond and the kernels of allied fruits, is decomposed by the action of the albuminous principle contained in such fruit; *vide* Amygdala Amara.

Prop. & Comp. The dilute acid, prepared as above, is a colourless liquid of peculiar odour and taste, entirely volatilized by heat, with a very slight re-action, and the reddening produced on litmus paper fugitive in character. Sp. gr. 0·997. It contains 2 per cent. of real or anhydrous acid (H, Cy). Treated with a minute quantity of a mixed solution of sulphate and persulphate of iron, and afterwards with potash, and finally acidulated with hydrochloric acid, it forms Prussian blue. With nitrate of silver it gives a white precipitate, entirely soluble in boiling nitric acid. Half a fluid ounce of the acid, when treated with an excess of solution of soda, requires the addition of 80·66 measures of the volumetric solution of nitrate of silver before a permanent precipitate begins to form, which corresponds to 2 per cent. of anhydrous acid. The explanation of this test is as follows: When nitrate of silver is added to a solution of hydrocyanic acid with excess of soda, a double cyanide of silver and sodium is formed, which is soluble, and is dissolved when the solution is well stirred; this salt is formed until all the hydrocyanic acid present is exhausted, and then the further addition of nitrate of silver causes the precipitation of the oxide of silver, which is insoluble. As the double cyanide has a definite composition, by knowing the

amount of nitrate of silver required to produce a permanent precipitate, we can calculate the amount of hydrocyanic acid present in the fluid. The decomposition may be illustrated by the formula, $Ag\ O, NO_5 + 2\ Na\ Cy = Na\ O, NO_5 + Na\ Cy, Ag\ Cy$. 17 grains of nitrate of silver, or 100 measures of the volumetric solution, representing 5·4 grains of absolute hydrocyanic acid.

The dilute acid, when pure, is not coloured by sulphuretted hydrogen or precipitated by chloride of barium, showing the absence of metallic taint or sulphuric acid, and no red colour is produced on the addition of the iodo-cyanide of potassium and mercury, showing the absence of any foreign acid.

The acid known under the name of Scheele's prussic acid contains 4 per cent. of anhydrous acid.

The anhydrous acid is colourless, with a more intense odour than the dilute, sp. gr. 0·697, very volatile, and rapidly decomposed into a carbonaceous-looking matter. The dilute acid can be much longer preserved when a little mineral acid is present, as a trace of sulphuric or hydrochloric acid.

Therapeutics. Anhydrous prussic acid is one of the most intense and rapid of poisons, acting as a direct sedative, apparently from arresting the functions of the whole body; its effects are the same whether taken into the stomach or applied to other mucous membranes, as to the eye, or inhaled as vapour.

When much diluted, and in medicinal doses, it allays pain and spasm, and if the dose be large, induces giddiness, etc. It is given in painful affections of the stomach and intestines, as in gastrodynia, enterodynia, pyrosis, and vomiting; also in chest affections, as pertussis, asthma, and other cases where the character of the cough is nervous; occasionally it is used to allay palpitation of the heart, especially when connected with dyspepsia, and it has been prescribed in epilepsy, chorea, and other diseases of the nervous system.

Externally applied it allays irritation of the skin, and when freely diluted may be used in the form of lotion in cutaneous affections accompanied with much itching: great care should be taken that the skin is not abraded.

Dose. Of the acidum hydrocyanicum dilutum 2 min. to 10 min. Scheele's acid is twice the strength, and it is very desirable

that it should not be employed in medicine. Aqua Lauro-Cerasi, or cherry-laurel water, which owes its activity to hydrocyanic acid, is described under Lauro-Cerasus.

Externally, in the form of lotion, 1 fl. drm. or more may be added to 10 oz. of water, lead lotion, or almond emulsion.

Incompatibles. It is often prescribed with alkalies, as liquor potassæ, etc.; then a cyanide of the metal is formed, which acts in the same manner as the acid; but if a salt of iron be also present, yellow prussiate or ferrocyanide of potassium is produced —a salt possessing none of the properties of prussic acid.

Sulphuretted Hydrogen. (Appendix.) Hydro-Sulphuric Acid (freshly prepared).

Prep. By treating sulphuret of iron with dilute sulphuric acid, and passing the gas which is evolved into cold distilled water.

Prop. & Comp. A colourless liquid, having the odour of rotten eggs; gradually decomposing, especially when exposed to air and light, with the deposition of sulphur. It is a watery solution of hydrosulphuric acid, or sulphuretted hydrogen (HS).

Uses. Used only as a test. It possesses the property of throwing down most of the ordinary metals from acid solutions: the precipitate with arsenic is yellow; with antimony, orange; with cadmium, yellow; with mercury, lead, copper, and silver, black; with bismuth and gold, brownish-black, etc. Zinc is precipitated white, from a slightly alkaline solution.

Sulphuretted hydrogen is a constituent of some mineral waters. When the gas is inhaled undiluted, it acts as a poisonous sedative.

Acidum Nitricum. Nitric Acid; Aqua fortis.

Prep. By the action of sulphuric acid in excess upon nitrate of potash in a glass retort, when nitric acid and bisulphate of potash are formed; the former, being volatile, distils over.

Prop. & Comp. A colourless transparent liquid, with a strongly acrid odour, and intensely acid taste; sp. gr. 1·50; [1·420, U. S.] it fumes in the air, and entirely volatilizes with heat. Composition (3 HO, 2 NO_5). When diluted with three times its volume of water and poured upon copper it gives off a colourless gas, which, upon contact with air, becomes an orange vapour, and

when conducted into a solution of sulphate of iron, communicates to it a dark colour. When diluted with six parts of water, it gives no precipitate, either with nitrate of silver, or chloride of barium. One fluid drachm of the acid requires for neutralization 121·5 measures of the volumetric solution of soda, indicating that not more than $1\frac{1}{2}$ equivalent of water is present.

Off. Prep. Acidum Nitricum Dilutum. Dilute Nitric Acid. (Nitric acid, two fluid ounces; distilled water, thirteen fluid ounces.) [Nitric acid, three troy ounces; distilled sufficient to make the diluted acid measure a pint; sp. gr. 1·068. U. S.]

Colourless; sp. gr. 1·101. Six fluid drachms require for neutralization one hundred measures of the volumetric solution of soda, indicating the presence of fifty-four grains of anhydrous nitric acid (NO_5).

Acidum Nitro-Hydrochloricum Dilutum. Dilute Nitro-Hydrochloric Acid. *Synonym.* Acidum Nitro-Muriaticum. (Nitric acid, two fluid ounces; hydrochloric acid, four fluid ounces; distilled water, twenty-six fluid ounces.) Sp. gr. 1·074. Six fluid drachms require for neutralization 93·88 measures of the volumetric solution of soda. [Acidum Nitro-Muriaticum. Nitric acid, three troy ounces; muriatic acid, five troy ounces. Acidum Nitro-Muriaticum Dilutum. Nitric acid, a troy ounce and a half; muriatic acid, two troy ounces and a half; distilled water sufficient to make the diluted acid measure a pint.]

Therapeutics. Externally, as a caustic, strong nitric acid is employed as an application to phagedenic sores, and for the destruction of warts, care being taken to protect the surrounding parts. In the diluted form, it has been used as an application to some ulcers, and diseases of the skin. Injected in a very dilute state into the bladder, it has proved effectual in the solution of phosphatic calculi. Internally it may be given as a refrigerant and tonic in cases similar to those for which sulphuric acid is administered, as in febrile diseases, and for preventing phosphatic deposits: it is also very useful in some forms of dyspepsia. But nitric acid seems to possess powers not connected with its acid properties, for in certain scrofulous states of the system, and in syphilis, occurring in habits where mercury cannot be given, nitric acid often proves very serviceable. It is also given in some forms of cutaneous diseases.

Dilute nitro-hydrochloric acid has an action similar to that of a solution of chlorine, and is used as a tonic and stomachic in dyspepsia; also in phosphatic deposits in the urine. It is thought to have a considerable influence over the action of the liver, and to possess alterative powers. It is employed in chronic hepatitis, syphilitic cachexia, &c. Externally it is used as a foot-bath in the above-named diseases.

Dose. Of the strong nitric acid, 1 min. to 3 min.; of the dilute, 10 min. to 30 min. freely diluted.

Of dilute nitro-hydrochloric acid, 3 min. to 10 min. freely diluted. As a bath, 6 fl. oz. to each gallon of water (in a wooden vessel).

Adulteration. Chiefly sulphuric and hydrochloric acids, detected by the baryta and silver tests above given.

Acidum Phosphoricum Dilutum. Dilute Phosphoric Acid. Phosphoric acid, dissolved in water.

Prep. (Phosphorus, four hundred and thirteen grains; nitric acid, four fluid ounces; distilled water, twenty fluid ounces or a sufficiency. To the acid mixed with water, placed in a retort in a sand-bath, add the phosphorus; then apply heat until five fluid ounces have distilled over; put these again into the retort, and renew and continue the distillation until the phosphorus has entirely dissolved. Transfer the contents of the retort to a porcelain capsule, and evaporate the liquid, raising the heat a little towards the close of the process, until bubbles of orange vapour cease to form, and a colourless liquid of a syrupy consistence is obtained. Lastly, add to the acid, when it has cooled, as much distilled water as may be requisite to make it accurately measure a pint.) When nitric acid diluted with water acts with the aid of heat upon phosphorus in a glass retort, the acid is decomposed into oxygen, which unites with the phosphorus to form phosphoric acid, and nitric oxide gas which escapes; a portion of the nitric acid distils over, and is returned into the body of the retort; the liquid which remains in the retort when all the phosphorus is dissolved, is then evaporated to a small quantity, in order to drive off any undecomposed nitric acid, and the syrupy solution of phosphoric acid afterwards diluted to the proper strength.

Prop. & Comp. As thus prepared, dilute phosphoric acid is a colourless liquid, without odour, of an agreeable acid taste; sp.

gr. 1·08. It contains between nine and ten per cent. of tribasic phosphoric acid in solution in water. Formula of acid, 3 HO, PO_5. It does not precipitate chloride of barium or nitrate of silver, nor is it coloured by sulphuretted hydrogen either before or after strips of silver or copper have been digested in it, these tests show the absence of sulphuric acid, chlorides, metallic impurities, or nitric acid. With ammonio-nitrate of silver phosphoric acid gives a canary-yellow precipitate soluble in ammonia, and in dilute nitric acid. When evaporated it leaves a residue which melts at a low red heat, and upon cooling exhibits a glassy appearance. It is not precipitated by a solution of albumen, which shows that it is not the monobasic variety of the acid. When mixed with an equal volume of pure sulphuric acid and then introduced into the solution of sulphate of iron, it does not communicate to it a dark colour, showing the absence of nitric acid.

Six fluid drachms poured upon 180 grains of litharge in fine powder, leave after evaporation a residue, which heated to dull redness weighs 215·5 grains, indicating the presence of 34·5 grains of dry acid (PO_5). [Acidum Phosphoricum Dilutum, U. S., prepared by a process identical in principle to that in the text, has a sp. gr. of 1·056. It is likewise directed to be prepared by dissolving a troy ounce of glacial phosphoric acid in three fluid ounces of distilled water, adding 40 grs. of nitric acid, boiling until reduced to a syrupy liquid, free from the odour of nitric acid, and then adding distilled water to make the diluted acid measure 12½ fluid ounces].

Therapeutics. Dilute phosphoric acid acts in a similar manner to dilute sulphuric acid, but is less powerfully astringent. It has been asserted to allay thirst in diabetes, and is supposed to exert an influence on the growth of osseous tumours.

Dose. 10 min. to 30 min. and upwards, freely diluted.

Adulteration. Sulphuric acid, hydrochloric acid, and metallic impurities detected by the above tests.

Acidum Sulphuricum. Sulphuric Acid; Monohydrated Sulphuric Acid; Oil of Vitriol.

Prep. Made by burning sulphur with a little nitre in leaden chambers, the sulphurous acid fumes coming in contact with nitrous acid and watery vapour, cause the higher oxidation of the sulphur,

and the formation of sulphuric acid; if sulphur is burnt without nitre, *sulphurous* acid is produced. The sulphuric acid of commerce, when free from arsenic, is directed in the Pharmacopœia to be purified by distilling it with a small quantity of sulphate of ammonia, by which means any nitrous acid is decomposed and got rid of.

Prop. & Comp. Sulphuric acid is an oily-looking colourless liquid; sp. gr. 1·846; [1·843. U. S.] having no odour, but an intensely burning acid taste, chars most vegetable substances and becomes darkened, absorbs water rapidly, and when mixed with it evolves great heat. Composition (HO, SO_3). An anhydrous acid (SO_3) can be made. Diluted with an equal measure of water it generally gives a slight white precipitate of sulphate of lead (derived from the leaden chambers), which is held in solution by the strong acid; when diluted with water it gives a copious precipitate with chloride of barium. Diluted with 12 parts of water, it should give no yellow precipitate with sulphuretted hydrogen, indicating the absence of arsenic, &c. One fluid drachm requires for neutralization 206 measures of the volumetric solution of soda. It leaves no residue when evaporated in a platinum crucible. When a solution of sulphate of iron is poured upon oil of vitriol, no purple ring is formed at the surface of the two solutions; this shows the absence of nitrous acid.

Off. Prep. Acidum Sulphuricum Aromaticum. Aromatic Sulphuric Acid. (Sulphuric acid, three fluid ounces; rectified spirit, a sufficiency to make forty fluid ounces; cinnamon, in coarse powder, two ounces; ginger, in coarse powder, one ounce and a quarter. Prepared by maceration and digestion.) Sp. gr. 0·935. Six fluid drachms require for neutralization 84·75 measures of the volumetric solution of soda. [U. S. Sulphuric acid, six troy ounces; ginger, in coarse powder, a troy ounce; cinnamon, in coarse powder, a troy ounce and a half; alcohol, a sufficient quantity; add the acid gradually to a pint of alcohol and allow the liquid to cool; mix the ginger and cinnamon, and, having put them into a percolator, pour alcohol gradually upon them until a pint of tincture is obtained; lastly, mix the diluted acid and the tincture.]

Acidum Sulphuricum Dilutum. Dilute Sulphuric Acid. (Sulphuric acid, three fluid ounces; distilled water, thirty-five fluid

ounces.) Sp. gr. 1·087. Six fluid drachms require for neutralization one hundred measures of the volumetric solution of soda. [Sulphuric acid, two troy ounces; add to make a pint. sp. gr. 1·082. U. S.]

Therapeutics. Externally the strong acid is a most powerful caustic, rapidly destroying all the tissues with which it comes in contact; internally, when much diluted it acts as a refrigerant, tonic, and astringent. It is used to allay thirst in fever, especially when of a hectic character, to check excessive sweating in phthisis, to diminish passive mucous discharges, and hæmorrhages, to improve digestion, and brace up the system in debility. Given for some time it increases the acidity of the urine, and may be employed in phosphatic deposits. It has likewise been found serviceable in some chronic skin diseases connected with a low state of system, as in pompholyx diutinus, &c. Recently it has been much extolled for checking diarrhœa. Externally, oil of vitriol rubbed up with lard is sometimes used as an ointment in very obstinate skin diseases, as in porrigo.

Dose. Of acidum sulphuricum dilutum, 5 min. to 25 min., freely diluted; of acidum sulphuricum aromaticum, 5 min. to 30 min.

Adulteration. Water, indicated by a lower specific gravity. Lead, detected on dilution; arsenic, from the use of impure sulphur in the manufacture; and hydrochloric acid, from impurities in the nitre made use of, are sometimes present. Oil of vitriol often becomes much discoloured from a trace of organic matter, such as wood, cork, &c.

The following tests are given in the British Pharmacopœia for ascertaining the quality of *Sulphuric Acid of Commerce*, contained in Appendix (A). Sp. gr. 1·84 to 1·85. When the acid mixed with six times its volume of distilled water is placed in contact with pure zinc, and the hydrogen evolved is ignited as it escapes from the capillary extremity of a glass tube, if a dark stain is formed on a piece of porcelain held low down on the flame, the acid contains arsenic, and is to be rejected. When a solution of sulphate of iron is poured cautiously on the surface of the undiluted acid, if a red tint appears at the surface of contact, the acid contains nitrous acid; and if the acid diluted with water as above becomes turbid, it contains other impurities, and in either case requires purification.

Acidum Sulphurosum. Sulphurous Acid. (Sulphurous acid gas, dissolved in water.)

Prep. By distilling sulphuric acid with wood charcoal in coarse powder.

Prop. & Comp. Water takes up 33 times its bulk of the gas: when fully saturated the solution is colourless, with the suffocating odour of burning sulphur; sulphurous acid is a powerful deoxidizing agent, liberating iodine from iodic acid, decomposing sulphuretted hydrogen, &c. Composition of sulphurous acid (SO_2).

The solution gives no precipitate, or a very slight one, with chloride of barium, indicating that no sulphuric acid is present, but a copious one if solution of chlorine be also added (sulphate of baryta). Sp. gr. 1·04. [Sp. gr. 1·035. U. S.] One fluid drachm mixed with a little mucilage of starch does not acquire a permanent blue colour with the volumetric solution of iodine, until 164 measures of the latter have been added, representing about $5\frac{1}{4}$ grains of sulphurous acid.

The formula representing the decomposition which ensues in the use of this volumetric test, is as follows: $SO_2 + I + HO = SO_3 + HI$; therefore, no blue colour appears until more than an equivalent of iodine has been added to each equivalent of sulphurous acid, or 3·2 grains of sulphurous acid require 12·7 grains of iodine, or 100 measures of its volumetrical solution; which is in the same ratio as 5·25 to 164 measures.

A solution of sulphurous acid when evaporated leaves no residue.

Therapeutics. Sulphurous acid has a destructive influence on vegetable life, and upon this its therapeutic value, probably, for the most part depends. Externally applied, it causes irritation and redness, and has been used for the treatment of skin affections, especially when connected with vegetation, as porrigo. It may be used in solution, more or less diluted, or applied as vapour from burning sulphur.

Internally it is not often employed in the free state, the vapour being suffocating in character.

See Sodæ Sulphis, and Sodæ Hyposulphis.

Dose. A strong solution of the acid may be diluted with about an equal bulk of glycerine or some other liquid, and painted on the affected skin.

Acidum Tartaricum. Tartaric Acid. An acid obtained from the acid tartrate of potash.

Prep. From the acid or bitartrate of potash (cream of tartar) by the addition of chalk, whereby an insoluble tartrate of lime is formed with half the acid in the bitartrate, and a neutral tartrate of potash left in solution; the acid of which is afterwards likewise formed into tartrate of lime by decomposition of the potash salt with chloride of calcium. Lastly, tartaric acid is separated from the purified tartrate of lime by decomposition with sulphuric acid. The formulæ representing the decompositions which occur in the above process may be thus exhibited:

1st part of process,—

$$2\,(HO, KO, C_8 H_4 O_{10}) + 2\,(Ca\,O, CO_2) = (2\,Ca\,O, C_8 H_4 O_{10}) + (2\,KO, C_8 H_4 O_{10}) + CO_2 + 2\,HO.$$

2nd part of process,—

$$(2\,KO, C_8 H_4 O_{10}) + 2\,(Ca\,Cl) = (2\,Ca\,O, C_8 H_4 O_{10}) + 2\,(K\,Cl.)$$

3d part of process,—

$$2\,(2\,Ca\,O, C_8 H_4 O_{10}) + 4\,(HO, SO_3) = 2\,(2\,HO, C_8 H_4 O_{10}) + 4\,(Ca\,O, SO_3).$$

Prop. & Comp. Tartaric acid occurs in white transparent crystals, which are oblique rhombic prisms, with a sour but agreeable taste, decomposed entirely by heat, soluble in water and in rectified spirit, the solution precipitating bitartrate of potash from any neutral salt of potash. The solution should not give a precipitate with chloride of barium, and any precipitate thrown down with acetate of lead should be soluble in nitric acid. 75 grains (half the equivalent in grains of tartaric acid, as this acid is bibasic) dissolved in water require for saturation 100 measures of the volumetric solution of soda.

Therapeutics. Tartaric acid acts in the same way as citric acid, as a refrigerant in fevers, diminishing thirst: it is more commonly given for such purposes in the form of cream of tartar, or with bicarbonate of soda, in an effervescing state.

Dose. 10 gr. to 30 gr. or more, dissolved in water and sweetened.

Adulteration. Sulphuric acid may be present from imperfect preparation. Bitartrate of potash and alum have occasionally been added.

The following are the tests for purity in the Pharmacopœia. The aqueous solution of tartaric acid is not affected by sulphuretted hydrogen, and gives no precipitate with the solution of sulphate of lime or of oxalate of ammonia; leaves no residue, or merely a trace, when burned with free access of air; these tests indicate the absence of oxalic acid, lime, or other fixed impurities.

Oxalic Acid. Appendix. [Not Officinal in U. S. P.]

The Oxalic Acid of Commerce is directed to be purified, by dissolving one pound of it in thirty fluid ounces of boiling water, filtering and crystallizing the acid from the filtered solution.

Prop. & Comp. Oxalic acid forms transparent four-sided prisms, soluble in water and alcohol. Its composition is represented by the formula, HO, $C_2 O_3 + 2$ HO. It is entirely dissipated by a heat below 350°.

Use. The solution of oxalic acid is used for quantitative and qualitative analysis.

AMMONIA AND ITS SALTS.

(NH_3).

When pure, ammonia is a colourless gas, capable of being liquified; of very pungent odour, the fumes producing an alkaline reaction; it forms salts with acids, but always takes an atom of basic water, and hence by most chemists these salts are regarded as containing an oxide of a hypothetical metal called ammonium (NH_4); thus sal ammoniac may be regarded as a hydrochlorate of ammonia (NH_3, HCl) or chloride of ammonium (NH_4 Cl). Ammonia also forms direct combinations with acids, as carbonic acid, not true salts; a compound of carbonic acid and ammonia (NH_3, CO_2) is perhaps present in the sesquicarbonate or so-called carbonate of the Pharmacopœia. Gaseous ammonia is sometimes made use of therapeutically, evolved usually when thus employed, from liquor ammoniæ, in which it is contained.

Ammoniæ Liquor Fortior. [Aqua Ammoniæ Fortior. U. S.] Strong Solution of Ammonia. Ammoniacal gas, (NH_3), dissolved in water and constituting 32·5 per cent. of the solution.

Prep. Hydrochlorate of ammonia is distilled with slaked lime, and the resulting ammonia (gas) passed into distilled water, which absorbs it with intensity, and forms the solution of ammonia.

Prop. & Comp. The strong solution has a sp. gr. 0·891, [sp. gr. 900, and containing 26 per cent. of the gas. U. S.] is colourless, giving off pungent fumes when exposed to air, and has a strong alkaline reaction. When diluted with four times its volume of distilled water no colour or precipitate should be produced by sulphuretted hydrogen or lime-water, by oxalate of ammonia, or ammonio-sulphate of copper; showing the absence of most ordinary metallic impurities, carbonic acid, lime, or arsenic; the solution, when treated with an excess of nitric acid is not rendered turbid by nitrate of silver or chloride of barium, indicating freedom from chlorides, or sulphates. One fluid drachm requires for neutralization 102 measures of the volumetric solution of oxalic acid. It contains therefore a fraction more than 17 grains (an equivalent) of ammonia in the fluid drachm.

Off. Prep. Liquor Ammoniæ. Solution of Ammonia. [Aqua Ammoniæ. Water of Ammonia. U. S.] (Strong solution of ammonia, twenty fluid ounces; distilled water, forty fluid ounces.) Sp. gr. 0·959. [Sp. gr. 0·960.] One fluid drachm requires for neutralization 30·8 measures of the volumetric solution of oxalic acid. It is about one-third of the strength of the strong solution.

Linimentum Ammoniæ. Liniment of Ammonia. (Solution of ammonia, one fluid ounce; olive oil, three fluid ounces.) [Two troy ounces. U. S.] Strong solution of ammonia is also an important ingredient in Linimentum Camphoræ Compositum.

Therapeutics. In medicinal doses free ammonia, as exhibited in any of its preparations, produces warmth at the epigastrium, and acts as an antacid; increases the force and frequency of the pulse, allays spasm, and promotes the secretions from the skin and mucous membranes, especially the bronchial. In larger doses throbbing and pain in the head, with heaviness, are induced; and in still larger medicinal doses, emetic effects; beyond this, poisonous irritant symptoms may be caused. The action of ammonia differs much from that of alcohol, probably influencing the ganglionic and spinal systems rather than the brain proper, and increasing the functions of the secreting and excreting organs. It does not render the urine alkaline, but perhaps a portion appears in that fluid as nitric acid. Externally applied, ammonia is rubefacient, and even vesicant; inhaled as a gas, it is topically irritant.

Ammonia is given to rouse the system in syncope; to diminish spasm in hysteria; to relieve nervous headache, the after-effects of alcohol, and delirium tremens; also as a stimulant in low states of the system, as typhoid forms of fever; in pneumonia and bronchitis, in which latter the expectorant power is also useful; as a stimulant and antacid in low forms of dyspepsia connected with increased secretion of acid and flatulence in the stomach. Externally it is employed to the mucous membrane of the nose in syncope and insensibility (in such cases care should be taken not to use too strong solutions); also occasionally it is inhaled, *very much diluted*, as an expectorant in chronic bronchitis. On the skin it is used, combined with volatile or essential oils, in most cases where a counterirritant effect is desired to be produced by means of an embrocation, as over painful parts, stiff joints, etc. Liquor ammoniæ fortior, rubbed up with lard, will vesicate rapidly, if evaporation is prevented. Ammonia may be used with advantage in poisoning with prussic acid, digitalis, tobacco, colchicum, and other sedative drugs.

Dose. Of liq. [aqua. U. S.] ammoniæ (not fortior) 10 min. to 30 min., well diluted. The dose of the strong solution is one-third of that amount.

Ammoniæ Carbonas. Carbonate of Ammonia.

Synonym. Ammoniæ Sesquicarbonas. *Lond. Dub.*

Prep. By heating a mixture of hydrochlorate of ammonia and chalk, when chloride of calcium, and carbonate of ammonia, are formed, the latter rises in vapour and is condensed. The exact changes are not, however, quite so simple, for a neutral carbonate of ammonium is not the result, as will be seen below. It is sometimes made from sulphate of ammonia and chalk; the sulphate being formed by the addition of gypsum or sulphuric acid to gas liquors or bone spirit.

Prop. & Comp. Colourless, almost transparent, crystalline masses, with powerful ammoniacal odour and acrid taste; strongly alkaline, volatilizes with heat, soluble in water, more sparingly in spirit; and readily dissolved by acids with effervescence. Its composition is represented by the formula, $2\ NH_4\ O,\ 3\ CO_2$. Exposed to air the odour is dissipated from the continued volatilization of the neutral carbonate at the ordinary temperature, and a white opaque salt remains: $2\ H_4\ NO,\ 3\ CO_2$ being resolved into

$[NH_4\ O,\ CO_2+HO,\ CO_2]+NH_3,\ CO_2$, or a compound of bicarbonate of oxide of ammonium, the odourless, less soluble and less volatile salt, and a pungent compound of ammonia and carbonic acid, which can scarcely be looked upon as a true salt of ammonia: the solution, when saturated with nitric acid, is not precipitated by chloride of barium or nitrate of silver, showing the absence of sulphates and chlorides. Fifty grains are exactly neutralized by 84·74 measures of the volumetric solution of oxalic acid. This salt should be kept in a crystallized state, not in powder.

Off. Prep. Spiritus Ammoniæ Aromaticus. Aromatic Spirit of Ammonia. (Carbonate of ammonia, eight ounces; strong solution of ammonia, four fluid ounces; volatile oil of nutmeg, four fluid drachms; oil of lemon, six fluid drachms; rectified spirit, one hundred and twenty fluid ounces; water, sixty fluid ounces: mix and distil one hundred and forty ounces.) [Spiritus Ammoniæ. Spirit of Ammonia. Take of muriate of ammonia, in small pieces, lime, each twelve troy ounces; water, six pints; alcohol, twenty fluid ounces. Pour a pint of water on the lime, and stir to the consistence of a smooth paste. Add the remainder of the water, and mix well. Decant the milky liquid from the sediment, into a glass retort, of the capacity of sixteen pints, and add the muriate of ammonia. Place the retort on a sand bath, and adapt it to a receiver, previously connected with a two-pint bottle containing the alcohol, by means of a glass tube reaching nearly to the bottom of the bottle. Surround the bottle with ice-cold water; and apply a gradually increasing heat until ammonia ceases to be given off. Lastly, remove the liquid from the bottle, and introduce it into small bottles, which must be well stopped. U. S.] [Spiritus Ammoniæ Aromaticus. Carbonate of ammonia, a troy ounce; water of ammonia, three fluid ounces; oil of lemon, two fluid drachms and a half; oil of nutmeg, forty minims; oil of lavender, fifteen minims; alcohol, a pint and a half; water, a sufficient quantity. Dissolve the carbonate in the water of ammonia, previously mixed with four fluid ounces of water. Dissolve the oils in the alcohol, mix, and add sufficient water to make the whole measure two pints. U. S.] The proportions of ammonia and carbonic acid in this preparation are such as to insure the formation of a neutral carbonate of ammonia. Its specific gravity is 0·870. Often called Sal Volatile.

Therapeutics. Carbonate or sesquicarbonate of ammonia, when fresh, acts both internally and externally in the same manner as free ammonia (*vide* Liq. ammoniæ); occasionally, but very seldom, it is used as an emetic; when old, or after exposure, it acts much less powerfully as an excitant, but resembles the other ammoniacal salts (*vide* Ammoniæ bicarbonas).

Dose. Of the salt, as a stimulant, 3 gr. to 10 gr. or more. As an emetic, 30 gr. may be given well diluted; occasionally useful as an emetic in asthenic bronchitis with deficient expectoration. Of aromatic spirits of ammonia, 20 min. to 1 fl. dr.

Adulteration. The salt may be deficient in volatile carbonate of ammonia on account of previous exposure; sulphates or chlorides may be present; these are detected by the tests given above.

Ammoniæ Bicarbonas. Bicarbonate of Ammonia. (Not officinal.)

Prep. By reducing the carbonate of ammonia to fine powder, spreading it out on a sheet of paper, and exposing it to the air for twenty-four hours, then keeping it in a well-stoppered bottle.

Prop. & Comp. A white powder when thus prepared, but it can be crystallized in six-sided prisms from a solution in water, of which, in the cold, about 8 parts are required for its solution; it has very little ammoniacal odour, and a saline, slightly pungent, taste. Composition (NH_4O, CO_2+HO, CO_2), or a double carbonate of ammonia and water.

Therapeutics. Very slightly stimulant and antispasmodic, but increases the capillary circulation and the secretions of the skin and mucous membranes.

Dose. 10 gr. to 30 gr. or more, dissolved in water, &c.

Sulphate of Ammonia. Appendix.

Prop. & Comp. Sulphate of ammonia is represented by the formula, NH_4O, SO_3.

Use. It is introduced into the appendix of the Pharmacopœia to be used in the purification of sulphuric acid. It is rarely employed as a therapeutic agent.

Ammoniæ Hydrochloras. [Murias. U. S.] Hydrochlorate of Ammonia; Sal Ammoniac.

Synonym. Ammoniæ Murias. *Edin. Dub.*

Prep. Generally prepared from gas liquor, by adding hydrochloric acid to neutralization, or by first forming a sulphate of ammonia, mixing this with common salt (chloride of sodium), and separating the hydrochlorate of ammonia (chloride of ammonium) from the sulphate of soda by sublimation, and collecting in leaden domes. It may be also made from bone spirit.

Prop. & Comp. Hemispherical cakes, or pieces of such, which have a peculiar tough, fibrous structure; crystallizes from solution in octahedra: the salt is devoid of odour, but has a strong saline taste; soluble in water, the solution being neutral [slightly reddens litmus. U. S.]; soluble also in rectified spirit: when its aqueous solution is heated with potash, soda, or lime, free ammonia is evolved; when heated with nitrate of silver it forms a copious curdy precipitate. It volatilizes with heat, and leaves no residue. The composition is represented by the formula, NH_4 Cl.

Therapeutics. Its action is not well understood; it produces no primary stimulant effect, but probably, after absorption, increases the secretions of skin and mucous membranes: by some it is considered cholagogue; by others it is regarded as emmenagogue; and there is good evidence of its action on the nervous system, as seen in its power of relieving pain in certain forms of neuralgia. It has been used as a substitute for mercury, in chronic inflammatory diseases, from an idea that it causes absorption of deposited lymph. Externally it is slightly stimulant, and supposed to have the power of dispersing tumors. It is not much used in Great Britain, but has been extensively employed in Germany and Russia in neuralgia and chronic rheumatism, and as an alterative. Externally it is applied in lotions to swollen parts, as glandular enlargements, &c.; occasionally, from the cold produced during its solution, as a refrigerant to the head.

Dose. 5 gr. to 30 gr.

Adulteration. Iron and lead are apt to be present in the commercial salt, from the apparatus employed in its manufacture; the former may arise from sublimation of chloride of iron; it stains the salt red; neither sublime by moderate heat: the former is detected upon the addition of a few drops of nitric acid and ferrocyanide of potassium, giving rise to prussian blue; the latter,

by a solution of iodide of potassium. Sometimes chloride of calcium is present, causing it to deliquesce.

Liquor Ammoniæ Acetatis. Solution of Acetate of Ammonia.

This solution contains about five times as much acetate of ammonia as Liquor Ammoniæ Acetatis, *Lond.*, and six times as much as Liquor Ammoniæ Acetatis, *Dub. Edin.* The dilute solution of the London Pharmacopœia was called Spirit of Mindererus.

Prep. Made by cautiously neutralizing the strong solution of ammonia with acetic acid. Much heat is evolved in the process [made by neutralizing diluted acetic acid by carbonate of ammonia. U. S.].

Prop. & Comp. A colourless solution, without odour, but with strong saline taste; sp. gr. 1·06; neutral in reaction; it consists of acetate of ammonia (NH_4 O, $\bar{A}$), dissolved in water; treated with potash, it evolves ammonia, and with sulphuric acid, acetic vapours. It should not be coloured by sulphuretted hydrogen, nor rendered turbid by a solution of lime; diluted with 4 volumes of water it gives no precipitate with nitrate of silver or chloride of barium. One fluid ounce treated with excess of hydrochloric acid, and evaporated to dryness by a water-bath, leaves a residue of hydrochlorate of ammonia weighing 100 grains. When evaporated, the salt which remains is entirely volatilized by heat.

Therapeutics. It is not a topical stimulant, as free ammonia and the carbonate, but it increases the secretions, especially of the skin, sometimes of the kidneys also; it is very commonly used in the treatment of febrile states of the system, as a diaphoretic and refrigerant. It is stated to relieve painful menstruation when given in large doses.

Dose. 10 min. to 40 min., freely diluted; even more may be given in dysmenorrhœa. [Of the U. S. preparation from half fl. ounce to two ounces.]

Adulteration. It should not contain free acid or alkali, nor be given with fixed alkalies, lime, or magnesia, as ammonia is then set free.

Ammoniæ Benzoas. Benzoate of Ammonia. [Not Officinal in U. S. P.]

Prep. (Solution of ammonia, three fluid ounces; benzoic acid, two ounces; distilled water, eight fluid ounces; dissolve and set aside to crystallize.)

Prop. & Comp. It occurs in colourless laminar crystals, which are readily soluble in water, in this respect differing from benzoic acid; soluble also in alcohol. The watery solution, when acidulated with hydrochloric acid, deposits benzoic acid. Heated with caustic potash it evolves ammonia. It is entirely sublimed by heat. The aqueous solution gives a bulky yellow precipitate with persalts of iron. The composition is represented by the formula, $NH_4\,O,\,C_{14},\,H_5\,O_3+HO$.

Therapeutics. Benzoate of ammonia acts as a diuretic and slight stimulant; it is employed in cases of chronic inflammation of the bladder, &c., where there is a tendency to phosphatic deposits. On account of its ready solubility it is much more readily administered than benzoic acid. It appears in the urine as hippuric acid.

Dose. 10 gr. to 20 gr.

Ammoniæ Oxalas. Appendix B. Oxalate of Ammonia; also its watery solution. [Not Officinal in U. S. P.]

Prep. By neutralizing a solution of oxalic acid by means of sesquicarbonate of ammonia, and subsequently evaporating and crystallizing the oxalate of ammonia which is formed.

Prop. & Comp. & Use. Colourless prismatic crystals; without odour; soluble in water. Composition ($NH_4\,O,\,C_2\,O_3+HO$). It is introduced into the Pharmacopœia, to be used in solution as a test for the detection of lime, and its separation from magnesia. It is a poisonous salt.

The solution of the oxalate of ammonia of the Appendix contains half an ounce of salt to 20 ounces of distilled water.

Ammoniæ Hydro-Sulphuretum. Appendix B. Hydrosulphuret of Ammonia. [Not Officinal in U. S. P.] A solution of hydro-sulphuret of ammonia in water.

Prep. To be made by passing sulphuretted hydrogen gas through a solution of ammonia to saturation.

Prop. & Comp. A greenish-yellow transparent liquid, with intensely disagreeable and pungent odour. Sp. gr. 0·999. Often used as a test, as it precipitates many metals. Composition of the salt ($NH_4 S+SH$), or a compound of sulphuret of ammonium and sulphuretted hydrogen.

Therapeutics. In large doses its acts as a powerful depressant on the nervous system, causing giddiness, drowsiness, and faintness, with nausea; in smaller ones it produces upon the secreting organs increased action, more especially seen on the bronchial mucous membrane and skin. It is used occasionally as a sudorific and expectorant in chronic skin diseases, rheumatism, and bronchitis; also in diabetes, in which it has been stated to diminish the morbid appetite, but it does not diminish the excretion of sugar. Dangerous if given incautiously, and not much employed.

Dose. 3 min. upwards, carefully increased, dropped into water at the time of administration, as it soon decomposes and deposits sulphur.

Incompatibles. Almost all metallic and acid solutions.

Ammoniæ Phosphas. Phosphate of Ammonia. [Not officinal in U. S. P.]

Prep. By mixing solutions of phosphoric acid and ammonia, and collecting the crystalline product which results.

Prop. & Comp. Phosphate of ammonia, $3\ NH_4\ O, PO_5+5\ HO$, forms large transparent prisms, which effloresce on exposure to air; it is soluble in water, insoluble in rectified spirit; heated with potash it evolves ammonia; it gives a canary-coloured precipitate with nitrate of silver; and when acidulated with hydrochloric acid is not affected by sulphuretted hydrogen. If 20 grains of this salt be dissolved in water and the solution of ammonio-sulphate of magnesia be added, a crystalline precipitate (ammonia-magnesian phosphate) falls, which when well washed upon a filter with solution of ammonia diluted with an equal volume of water, dried and heated to redness, leaves 11·44 grains.

Therapeutics. Phosphate of ammonia, when in solution, is capable of dissolving a considerable amount of urate of soda; and clinical experience has shown that it is of great value in the treat-

ment of certain urinary diseases, where a tendency to uric acid calculi exists, and also in certain conditions of the gouty habit.

Dose. 5 gr. to 20 gr. freely diluted.

The Iodide and the Bromide of ammonium have been sometimes used in medicine.

The **Iodide of Ammonium** seems to have nearly the same action as the iodide of potassium; it forms a white crystalline salt, and may be given in the same doses as the last-named salt. See Potassii Iodidum.

The **Bromide of Ammonium** has been used in some cases as an anæsthetic to deaden the sensibility of the fauces and palate, and in some forms of convulsive diseases, as pertussis, &c. The action is probably the same as that of the bromide of potassium. The dose is five to ten or even fifteen grains. See Potassii Bromidum.

METALLIC PREPARATIONS (ALPHABETICALLY ARRANGED).

ALUMINUM.

(Al. Eq.=13·75.)

This metal does not exist native, but is formed artificially from certain of its compounds. It has a steel-grey colour, sp. gr. 2·67, and is not readily oxidized. It forms only one oxide ($Al_2 O_3$), a very weak base, which occurs pure in the sapphire, and combined with silica in clay, schists, &c.

Alumen. Alum. Sulphate of Alumina and Potash, crystallized.

Prep. Usually made by burning alum schist, which contains metallic sulphurets as well as alumina, and subsequent exposure to air, by which means sulphuric acid is formed; this unites with the alumina, and the after-addition of sulphate of potash to the solution, causes the formation and crystallization of the alum.

Prop. & Comp. Alum is a double sulphate of alumina and potassa ($Al_2 O_3$, $3 SO_3 + KO$, $SO_3 + 24 HO$); it forms transparent, white, regular octahedral crystals, having an acid sweet astringent taste; it is slightly efflorescent in dry air, from a loss of some of its water of crystallization; soluble in 18 parts of

water at 60° Fah., in less than its own weight of boiling water. Alumina is precipitated from a solution of alum by the addition of alkalies and their carbonates, but re-dissolved by excess of the former. A solution of alum gives also an immediate precipitate with chloride of barium (sulphate of baryta), and, after some hours, a crystalline precipitate with tartaric acid (bitartrate of potash). It should not be coloured blue by a mixture of ferrocyanide and ferricyanide of potassium (indicating that neither protoxide nor peroxide of iron is present). Alum should be entirely soluble in hot solution of soda, without the evolution of ammonia, showing that it is a true potash salt; as occasionally sulphate of ammonia replaces, wholly or in part, the sulphate of potash.

Off. Prep. Alumen Exsiccatum. Dried Alum. It is simply alum deprived of its water by heat, which first fuses the salt, and then drives off the water of crystallization; this forms 45·43 per cent. of its weight. Dried, or burnt alum, as it is commonly termed, occurs as a white or light spongy mass, which unites with water with some intensity. It is usually reduced to powder before being employed as a medicinal agent.

Therapeutics. Alum acts as an astringent, and if applied as alumen exsiccatum, or burnt alum, it is a slight escharotic. Internally it first acts upon the mucous membrane of the stomach and intestines; it is afterwards absorbed, and produces remote astringent effects on the various secreting and other organs. In large doses it is a purgative. It is employed topically as a gargle or injection in sore throat, leucorrhœa, &c.; internally in hæmorrhages and passive discharges; sometimes in colica pictorum as a purgative. Alum has also gained repute in the treatment of hooping-cough.

Dose. Of alum 10 gr. to 20 gr. as an astringent, alone or combined with kino, &c.; from 30 gr. to 60 gr. may be given as a purgative. [In doses of 1 or 2 drachms, it operates as an emetic.] Dried alum is for external use only.

Incompatibles. Alkalies and their carbonates, tannic acid, or infusions and decoctions containing it; tartrates, salts of lead, baryta, lime, cause precipitates in solutions of alum.

ANTIMONIUM. ANTIMONY.

(Sb. Eq.=122.)

This element is not employed in medicine in its metallic state; all the preparations are prepared from the native or black tersulphuret, the most abundant ore. The symbol Sb. is derived from *Stibium*, a Latin name for antimony.

Sulphuret of Antimony, prepared. Appendix A.

Prep. Made by fusing the ore, to separate it from impurities, and afterwards reducing it to powder.

Prop. & Comp. It occurs in crystalline metallic-looking masses, which have a striated appearance, and are of a steel-grey colour. The composition in $Sb\,S_3$. It is soluble in boiling hydrochloric acid, giving off sulphuretted hydrogen; the solution is precipitated when thrown into water, a white oxychloride of antimony being formed.

Off. Prep. Not used as a drug, but employed in the preparation of the sulphurated antimony, tartarated antimony (tartar emetic), and terchloride of antimony.

Antimonium Sulphuratum. Sulphurated Antimony.

Synonym. Antimonii Oxysulphuretum. *Lond.*
" Sulphuretum Aureum. *Edin.*
" " Precipitatum. *Dub.*

Prep. By boiling ten ounces of prepared sulphuret of antimony for two hours with four pints and a half of solution of soda, constantly stirring, distilled water being often poured in that it may fill nearly the same measure. The solution is strained through calico, and before it cools dilute sulphuric acid is added in slight excess. The precipitate is collected on a calico filter, the sulphate of soda washed away with water, and the precipitate dried at a temperature not exceeding 212°.

Prop. & Comp. A bright orange or golden red powder, without odour and with slight taste; insoluble in water, almost entirely soluble in hot hydrochloric acid with evolution of sulphuretted hydrogen, a little sulphur remaining undissolved; the acid solution dropped into water gives a copious white precipitate; it is also readily dissolved by caustic soda or potash. The formula

($Sb\ O_3 + 5\ Sb,\ S_3 + 15\ HO$) has been assigned to this substance, but it is probably not a true chemical compound, only a mixture of tersulphuret of antimony ($Sb\ S_3$) with a small and variable amount of teroxide ($Sb\ O_3$). Sixty grains of this preparation dissolved in hydrochloric acid and dropped into water give a white precipitate (oxychloride, $Sb\ Cl_3,\ 5\ Sb\ O_3$?), which when washed and dried weighs about 53 grains.

Off. Prep. It forms a part of Pilula Calomelanos Composita.

Therapeutics. It possesses the same properties as other antimonial preparations, *vide* Antimonium Tartaratum; is rather uncertain in action from its slight solubility, and is seldom used except as an alterative in the compound calomel pill.

Dose. 1 gr. to 5 gr. as an alterative; 10 gr. and upwards as an emetic (not used as such).

Antimonium Tartaratum. Tartarated Antimony. [Antimonii et Potassæ Tartras, U. S.]

Synonym. Antimonii Potassio-Tartras. *Lond.* Often termed Tartar Emetic.

Prep. By mixing five ounces of oxide of antimony with six ounces of acid tartrate of potash in fine powder, and a little water so as to form a paste, and setting the mass aside for twenty-four hours; afterwards boiling it in water for a quarter of an hour, filtering the solution, and allowing the clear filtrate to crystallize. In this process one equivalent of oxide of antimony ($Sb\ O_3$) replaces the equivalent of water in the acid tartrate of potash ($HO,\ KO,\ C_8\ H_4\ O_{10}$).

Prop. & Comp. Colourless transparent crystals, exhibiting triangular facets (rhombic octahedra) with slight metallic taste. Composition ($Sb\ O_3,\ KO,\ C_8\ H_4\ O_{10} + 2\ HO$). The crystals effloresce slightly in dry air; are soluble in about 20 parts of boiling water; partially soluble in proof spirit and insoluble in alcohol: they decrepitate and blacken upon the application of heat. The watery solution decomposes readily with the formation of algæ (Sirocrocis tartarica); is precipitated orange-red by sulphuretted hydrogen, not by ferrocyanide of potassium, chloride of barium, or nitrate of silver unless the solution is concentrated. Nitric acid gives a precipitate soluble in excess of the acid. The watery so-

lution gives a white precipitate with hydrochloric acid, which is not formed if tartaric acid be previously added. Twenty grains dissolve without residue in a fluid ounce of distilled water at 60°, and the solution gives with sulphuretted hydrogen an orange precipitate, which when washed and dried at 212° weighs 9·91 grains.

Off. Prep. Vinum Antimoniale. Antimonial wine. (Tartarated antimony, forty grains; sherry wine, twenty ounces.) Two grains of the salt are contained in each ounce of the wine.

Unguentum Antimonii Tartarati. [Unguentum Antimonii, U. S.] Ointment of Tartarated Antimony. (Tartarated antimony, in fine powder, a quarter of an ounce; simple ointment, one ounce.) The ointment contains one part of antimonial salt in five parts of the preparation, and nearly twice as much tartarated antimony as unguentum antimonii tartarati. *Dub.*

Therapeutics. Internally, in small doses, tartar emetic acts on the skin and mucous membranes, and is diaphoretic, expectorant, and probably cholagogue. In larger doses it acts at first as an emetic, sometimes as a purgative; if continued, tolerance becomes established, and it then produces a powerful sedative effect upon the vascular system (not the heart especially) and upon all the muscles. Externally it is powerfully irritant, and produces pustules having the character of those in Variola; occasionally when thus applied it becomes absorbed, and hence may be dangerous in very young subjects. Tartar emetic is used in febrile affections to promote secretions; in severe inflammation, as in acute pneumonia and bronchitis, as a vascular depressant; also in the reduction of dislocations; not unfrequently as an addition to purgative medicines. It is frequently employed as an emetic, being adapted to cases in which depression of the circulation is not objectionable. Externally, in the form of ointment, or hot aqueous solution, it is used as a powerful counterirritant in head and abdominal affections, also over diseased joints, and other chronically inflamed parts.

Dose. Of tartar emetic; as a diaphoretic, expectorant, &c., $\frac{1}{16}$ gr. to $\frac{1}{6}$ gr.; as a vascular depressant or sedative, $\frac{1}{6}$ gr. to 2 gr.; as an emetic, 1 gr. to 3 gr.

The wine is objectionable in cases where large doses of the salt are required for its depressant effect, but is a useful form for administration in doses of 15 min. to 40 min. in febrile affections, &c.

Incompatibles. Acids, alkalies, and their carbonates cause precipitates in the solutions of this salt; also some earthy and metallic preparations, as those of lime, lead, &c.; but caustic alkalies in excess redissolve the precipitate. Astringent vegetable infusions throw down an insoluble tannate of antimony.

Adulteration. Cream of tartar is the only adulteration likely to be met with; this can be detected by its being less soluble in water than tartar emetic, and by finding that upon the addition of a small quantity of carbonate of soda to a boiling solution of the suspected salt, the precipitated oxide of antimony, which is at first thrown down, becomes redissolved from the presence of the free acid of the acid tartrate of potash.

Antimonii Oxidum. Oxide of Antimony.

Prep. This is prepared by pouring a solution of terchloride of antimony into water, and treating the resulting precipitate of oxychloride of antimony with carbonate of soda, by which means oxide of antimony and chloride of sodium are formed. The oxide is afterwards washed and dried at a heat not exceeding 212°.

Prop. & Comp. Teroxide of antimony ($Sb\ O_3$) is a white powder fusible at a low red heat, and readily dissolved by hydrochloric acid. The solution, dropped into distilled water, gives a white deposit, changed to orange yellow by sulphurretted hydrogen. Oxide of antimony does not yield any sublimate when fused in a test tube, showing the absence of arsenious acid; and it dissolves entirely when boiled with an excess of the acid tartrate of potash.

Off. Prep. Pulvis Antimonialis. [Not officinal in U. S. P.] Antimonial Powder. (Oxide of antimony, one ounce; precipitated phosphate of lime, two ounces.) This is intended as a substitute for "James' powder."

Therapeutics. The oxide of antimony is analogous in its action to tartar emetic; but on account of the slowness with which it dissolves in the stomach, it is less likely to cause local irritation, and it may be employed with advantage when the diaphoretic and slightly alterative effects of antimony are required.

Dose. Of oxide of antimony, 1 gr. to 5 gr.; of antimonial powder, 3 gr. to 15 gr.

Antimonii Terchloridi Liquor. Solution of Terchloride of Antimony. Terchloride of Antimony ($Sb Cl_3$), dissolved in hydrochloric acid.

Prep. Made by dissolving one pound of the prepared tersulphuret in four pints of hydrochloric acid with the aid of heat, and reducing the solution to two pints.

Prop. & Comp. A heavy liquid, of a yellowish-red colour; sp. gr. 1·47. A little of it dropped into water gives a white precipitate, which becomes orange when treated with sulphuretted hydrogen. The solution, filtered from the white precipitate, gives rise to a copious deposit when treated with nitrate of silver. These reactions show that antimony and chlorine are present in the solution. One drachm, mixed with a solution of a quarter of an ounce of tartaric acid in four ounces of water, gives a precipitate with sulphuretted hydrogen, which, when washed and dried at 212°, weighs at least 22 grains, indicating the amount of antimony.

Therapeutics. This solution of terchloride of antimony is a powerful caustic and escharotic. It is applied sometimes to cancerous growths, and also to poisoned wounds, to the bites of venomous serpents, etc. It is never administered internally, but is used in the preparation of the oxide of antimony.

ARGENTUM. SILVER.

(Ag. Eq.=108.)

Silver. Appendix A. Metallic Silver, refined.

Silver, in its metallic state, is not used in medicine, except as a coating for pills, but is introduced in the Appendix for the purpose of making the nitrate of silver; when pure, it is very white and malleable, sp. gr. 10·50, it is acted on readily by sulphuretted hydrogen, and becomes black, but is not oxidised in the air; it is soluble in nitric acid. Silver leaf is the form made use of if the metal is employed as a test.

Argenti Nitras. Nitrate of silver.

Prep. Three ounces of refined silver are dissolved by the aid of a gentle heat in one fluid ounce and three quarters of nitric acid, previously diluted with five ounces of water; the clear solution is then evaporated and allowed to crystallize.

Prop. & Comp. Nitrate of silver (Ag O, NO_5), when crystallized, is in colourless right rhombic prisms; when fused, in the form of small white pencils or sticks, crystalline in structure. It is soluble in its own weight of water at 60° Fah., insoluble in alcohol, but soluble in rectified spirit. It gives a copious white precipitate with hydrochloric acid, which becomes dark by exposure to light; soluble in solution of ammonia, but not in nitric acid. Ten grains dissolved in distilled water give with hydrochloric acid a precipitate which when washed and dried weighs 8·44 grains, and the filtrate when evaporated by a water bath leaves no residue; indicating the proper amount of the metal, and the absence of impurities. It stains the skin black, and forms insoluble compounds with animal tissues. It should be kept from the light.

Off. Prep. Volumetric Solution of Nitrate of Silver. (Nitrate of silver, 148·75 grains; distilled water, twenty fluid ounces.) This solution is used for the quantitative estimation of hydrocyanic acid, and likewise as a qualitative test for the presence of chlorides, etc.

Therapeutics. Externally it is astringent, irritant, vesicant, or even escharotic, according to the mode of its application; it may be used in solution of the strength of from half a grain to half a drachm to the fluid ounce, or in the solid form. Internally, in small doses, it acts as an astringent and alterative to the mucous membrane of the stomach and intestines, is absorbed and produces remote astringent effects, and also influences the nervous system as a tonic; when long continued, it may stain the surface of the body of a blue or leaden hue, but such an effect has not been known to occur under less than three months' continuous use of the drug.

It is used to poisoned wounds, pustules, ulcers (venereal or others), and erysipelatous inflamed parts; also to diminish or destroy morbid growths. Occasionally it is rubbed on the skin, to produce vesication.

In solutions of different strengths, it is used as a lotion, injection, or collyrium. Internally, it is often of great value in gastric affections of a chronic inflammatory character, accompanied by gastrodynia, pyrosis, or vomiting; also in certain forms of diarrhœa; and as a nervous tonic in chorea and epilepsy.

Dose. ¼ gr. to ½ gr. or more, made into a pill with crumb of bread or some ingredient which does not decompose the salt.

Incompatibles. Its solution should be made with distilled water, as the chlorides decompose the silver salt; nitrate of silver is seldom given in the form of solution on account of its very disagreeable taste, and its decomposing almost all vegetable infusions, which could be prescribed with it; probably the chloride of silver and other insoluble compounds would act as therapeutic agents.

Adulteration. It is apt to contain copper, and lead, or, when in the fused form, nitrate of potash; if copper, its solution, after complete precipitation by common salt, will be blackened by sulphuretted hydrogen; if lead, the precipitate formed by the addition of common salt, is not entirely dissolved by ammonia; if nitre or any other substance, then seventeen grains of the silver salt will not be sufficient to precipitate entirely six grains of chloride of sodium, or the salt will not answer the test given above.

[Argenti nitras fusa. Fused nitrate of silver. Nitrate of silver melted and run into suitable moulds.]

Argenti Oxidum. Oxide of Silver.

Prep. A solution of half an ounce of nitrate of silver in four fluid ounces of distilled water, is poured into four pints or a sufficiency of lime water, and the mixture well shaken, and set aside to allow the deposit to settle; the supernatant fluid having been drawn off, the deposit should be collected on a filter, washed with distilled water, and afterwards dried at a temperature not exceeding 212° Fah., and kept in a stoppered bottle. [In the P. U. S. solution of Potassa is used instead of lime water.]

Prop. & Comp. The oxide of silver (Ag O) is a dark olive-brown powder, becoming black by age; insoluble in water, but soluble in ammonia and likewise in nitric acid without the evolution of any gas; readily decomposed by heat, and even by the action of light, when long continued, into metallic silver and oxygen.

Therapeutics. Very similar to the nitrate, except that the topical action is slight; after absorption, its effects are probably the same. It has been asserted to be a very valuable astringent

in hæmorrhages. It may be used when the remote action of silver is required, as in diseases of the nervous system, as a nervine tonic.

Dose. ½ gr. to 2 gr., in the form of pill.

Tests for purity. Twenty-nine grains of oxide of silver yield 27 grains of metallic silver when heated to redness. The equivalent of the oxide is 116, and of metallic silver 108; and 116 is to 108 as 29 to 27.

Incompatibles. Oxide of silver, from the readiness with which it parts with its oxygen, decomposes many organic substances. It is particularly incompatible with creasote, with which it forms a compound, liable to spontaneous combustion.

The *Chloride of Silver* has also been given as a remedy: its action is probably similar to that of the oxide.

ARSENICUM. ARSENIC.

(As. Eq.=75.)

Arsenic occurs chiefly in the form of arseniuret of iron, nickel, or cobalt. Metallic arsenic is not employed in medicine; when pure, it is dark steel-coloured, with metallic lustre, crystalline, and brittle; sp. gr. 5·8; very volatile, and when heated gives off an odour like garlic; it forms with oxygen two acids, and combines readily with sulphur.

Acidum Arseniosum. Arsenious Acid; White Arsenic.

Prep. Usually collected in flues during the smelting of the arseniurets, and afterwards purified by introducing some of the commercial arsenious acid into a thin porcelain capsule, and covering the capsule with a glass flask filled with cold water and fitting pretty closely, then applying the heat of a lamp. The arsenious acid being volatile, rises in the form of vapour, and condenses and adheres to the bottom of the flask.

Prop. & Comp. The composition of arsenious acid is, $As\ O_3$. The commercial article usually occurs in broken pieces of the cakes, into which it had been sublimed; it is transparent and glass-like at first, but becomes after a time opaque white or yellowish.

The medicinal acid, or that which has been resublimed by the above process, is in the form of a crystalline, heavy, white pow-

der; soluble in about 100 parts of cold water—much more in boiling water, which, on cooling, deposits octahedral crystals of the acid; when sublimed slowly in a tube, the same octahedral crystals are seen. When mixed with charcoal and heated, metallic arsenic sublimes with an alliaceous odour. The solution of arsenious acid is precipitated yellow by sulphuretted hydrogen, and lemon or canary-yellow colour by ammonio-nitrate of silver, and green with sulphate of copper, after the addition of potash.

Tests for purity. It is entirely volatilized by heat. Four grains dissolved in boiling water with 8 grains of bicarbonate of soda, discharge the colour of 80·8 measures of the volumetric solution of iodine. This decolorization is effected by the conversion of the iodine into hydriodic acid. The change may be represented by the formula, $As\,O_3+2\,HO+2\,I=As\,O_5+2\,HI$, two equivalents of iodine corresponding to one equivalent of arsenious acid; or one equivalent of iodine, 127, to half an equivalent of arsenious acid, 49·5. Thus 100 measures of the volumetric solution, which contain 12·7 grains (or one-tenth of an equivalent) of iodine, represent 4·95 grains (or one-tenth of half an equivalent) of arsenious acid. One hundred grains should give 124 of tersulphuret of arsenic (orpiment) when precipitated with sulphuretted hydrogen in an acid solution.

Off. Prep. Liquor Arsenicalis. Arsenical Solution. A mixed solution of arsenite and carbonate of potash. [Liquor Potassæ Arsenitis. Solution of Arsenite of Potassæ. U. S.]

Synonym. Liquor Potassæ Arsenitis. *Lond.*

Arsenious acid, broken into small pieces, carbonate of potash, each, eighty grains; compound tincture of lavender, five fluid drachms; distilled water, one pint. Boil the acid and carbonate with half a pint of water, until they are dissolved. To the cold liquor add the tincture; and lastly, as much of the water as may be requisite, that it may accurately measure a pint.) This solution was formerly known as Fowler's Solution; four grains of arsenious acid are contained in each fluid ounce. Sp. gr., 1·009. [The preparation is identical with that of the U. S. P. In the latter, however, the pint of the solution contains but 64 grains of arsenious acid, the apparent difference being caused by the use of the wine pint divided into 16 fl. ounces, instead of the

imperial pint of the Br. P.] One fluid ounce boiled for five minutes with ten grains of bicarbonate of soda, and then diluted with six fluid ounces of water to which a little mucilage of starch has been added, does not give with the volumetric solution of iodine a permanent blue colour, until eighty-one measures, (representing four grains of arsenious acid) have been added. The explanation of this test is the same as that given under the head of arsenious acid itself. The addition of the starch insures the detection of free iodine more readily.

Therapeutics. In minute doses the effects of arsenic appear to be directed to the skin and nervous system, being alterative and tonic in their nature: in larger doses, irritation of the alimentary canal and of the mucous membrane of the eyes is produced; in still larger, poisonous effects ensue: externally, it acts as an escharotic, and may be absorbed to a dangerous extent. It is employed internally in chronic skin affections, more especially when of a squamous or tubercular character; also as an antiperiodic in agues and neuralgic affections; and in chorea and epilepsy it is sometimes more effectual than quinine.

Dose. Of arsenious acid $\frac{1}{60}$ gr. to ^{1} gr., or $\frac{1}{12}$ gr. Of liq. arsenicalis, 2 min. to 5 min., or occasionally to 10 min. Preparations of arsenic should be given soon after a meal, and pain in the epigastrium, nausea, and irritation of the eyelids, should be looked upon as indications for diminishing the dose.

Adulteration. Gypsum and chalk, which have been sometimes mixed with arsenious acid, can be readily detected by not subliming with heat.

Sodæ Arsenias. Arseniate of Soda. [Not officinal in U. S. P.]

Prep. Made by finely powdering and intimately mixing together ten ounces of arsenious acid, eight and a half ounces of nitrate of soda, and five and a half ounces of dried carbonate of soda, afterwards putting the mixture into a large clay crucible, covered with a lid, and exposing it to a full red heat, till effervescence has ceased and complete fusion has taken place.

Prop. & Comp. Occurs in colourless transparent prisms. The formula is, $2Na\ O, HO, As\ O_5 + 14\ HO$. Soluble in water, the solution giving a brick-red precipitate with nitrate of silver ($3\ Ag\ O, As\ O_5$), and a white precipitate with chloride of barium,

chloride of calcium, and sulphate of zinc, all of which precipitates are soluble in nitric acid. The precipitate with silver is also soluble in excess of ammonia. Arseniate of soda heated to 300° loses 40·38 per cent. of its weight. A watery solution of 10 grains of the residue, treated with 5·3 measures of the volumetric solution of soda, continues to give a precipitate with the volumetric solution of nitrate of silver, until 161·3 measures of the latter have been added, equivalent to 18·5 grains of arsenic acid ($As O_5$).

Off. Prep. Liquor Sodæ Arseniatis. Solution of Arseniate of Soda. (Arseniate of Soda, rendered anhydrous by a heat not exceeding 300°, four grains; distilled water, one fluid ounce.)

Therapeutics. Arseniate of soda may be employed in the same cases as arsenious acid or the arsenical solution. Its action, measured by the amount of metallic arsenic contained in it, appears to be milder than that of the metal in the lower form of oxidation. See Therapeutics of Arsenious Acid.

Dose. Of the crystallized salt $\frac{1}{12}$ gr. to $\frac{1}{2}$ gr.; of the salt dried at 300°, $\frac{1}{20}$ gr. to $\frac{1}{4}$ gr.; of liquor sodæ arseniatis, 5 min. to 30 min. Some patients are very intolerant of arsenic, and much smaller doses must then be administered.

Ferri Arsenias. Arseniate of Iron. See Iron Salts.

Arsenici et Hydrargyri Hydriodatis Liquor. Solution of Hydriodate of Arsenic and Mercury; Donovan's Solution. (Not officinal.)

Prep. (Pure arsenic, in fine powder, six grains: pure mercury sixteen grains; pure iodine, fifty and a half grains; alcohol, half a fluid drachm; distilled water, nine ounces or a sufficient quantity. Rub together the arsenic, mercury, iodine, and spirit, until a dry mass is obtained, and having triturated eight ounces of the water with this in successive portions, let the whole be transferred to a flask, and heated until it begins to boil. When cooled and filtered, let as much distilled water be added to it as will make the bulk of the solution exactly eight fluid ounces and six drachms.) [Liquor Arsenici et Hydrargyri Iodidi. Solution of Iodide of Arsenic and Mercury. 35 grains of the Iodide of Arsenic and the same quantity of the Red Iodide of Mercury are dissolved in half a pint of distilled water. U. S.]

Prop. & Comp. A very pale greenish-coloured liquid, having

no odour, but a styptic taste; it probably contains the red iodide of mercury (Hg I) and ter-iodide of arsenic (As I_3).

Therapeutics. It has been used chiefly in obstinate skin affections, and seems occasionally to be useful when other preparations of arsenic fail; it is peculiarly applicable to those depending on venereal taint. Externally, freely diluted, it has been used as a lotion in similar cases.

Dose. 10 min. to ½ fl. drm. diluted, and given with the precautions enjoined for the other preparations of arsenic. Each fl. drm. contains about 0·086 gr. of metallic arsenic.

AURUM. GOLD.

(Au. Eq.=196·5.)

Aurum. Gold. Appendix B. [Not officinal in U. S. P.] Fine gold; in mass or leaf.

Gold, when pure, is a soft, malleable, yellow metal; sp. gr. 19·5; introduced into the Pharmacopœia for forming a solution. Gold is not acted on by nitric or any other simple acid, only by nitro-hydrochloric acid or chlorine. The test solution of the ter-chloride of gold is formed by dissolving gold in nitro-hydrochloric acid; evaporating to dryness, and re-dissolving the resulting ter-chloride in distilled water. It is used as a test for Atropine, etc.

Therapeutics. Metallic gold in a state of very minute division (Pulvis Auri), the ter-oxide (Au O_3) and ter-chloride (Au Cl_3), have been employed in medicine. Gold appears to act in a very similar manner to mercury; its use has been chiefly confined to the treatment of venereal and scrofulous affections; as yet its action has not been well made out. The preparation most employed is a double chloride of gold and sodium (Au Cl_2, Na Cl +4 HO), which occurs as an orange-coloured salt in quadrangular prisms. Leaf gold is much used by dentists for stopping teeth.

Dose. Of powdered gold, ¼ gr. to 1 gr.; of ter-oxide, $\frac{1}{10}$ gr. upwards; of ter-chloride or of the double salt, gr. $\frac{1}{20}$ upwards. The chloride is very poisonous, acting in a manner similar to corrosive sublimate.

BARIUM.

(Ba. Eq.=68·5.)

Barium, the metallic base of the Baryta salts, when separated, forms a brilliant white metal.

Barii Chloridum. Appendix B. Chloride of Barium, in crystals.

Prep. By acting on the native carbonate of baryta (Witherite) by means of hydrochloric acid assisted by heat.

Prop. & Comp. Flat rectangular, white, transparent crystals with bevelled edges; taste acrid and disagreeable; pretty soluble in water. Composition of crystals (Ba Cl + 2 HO).

Off. Prep. Solution of Chloride of Barium. Appendix B. (Chloride of Barium in crystals, one ounce; distilled water to ten fluid ounces.)

Use. Chloride of barium is introduced into the Pharmacopœia as a test for detecting the presence of sulphuric acid or sulphates in solution; the precipitated sulphate of baryta forms a heavy white powder, insoluble even in boiling nitric acid.

Therapeutics. Chloride of barium has been employed in medicine, and in small doses appears to act as an alterative, especially, affecting the glandular system; it is also supposed to act on the nervous centres. It is, however, a very poisonous salt, and is seldom used therapeutically.

Dose. ½ gr. to 2 gr. and upwards.

BISMUTH.

(Bi. Eq.=210.)

Metallic Bismuth. Appendix A.

Description. A pinkish white metal, occurring native, fusing readily, and crystallizing in cubes or octahedra; sp. gr. 9·8; soluble in nitric acid, precipitated by water: introduced only for the formation of the nitrate.

Bismuthum Album. White Bismuth. [Bismuthi Sub Nitras Sub Nitrate of Bismuth. U. S. P.]

Synonym. Bismuthi Nitras. *Lond.* Bismuthi Subnitras. *Dub.*

Prep. Made by dissolving two ounces of bismuth (in coarse

powder) in two fluid ounces and a half of nitric acid, diluted with three ounces of water, aiding the solution by heat; when the effervescence has ceased, decanting from impurities, evaporating the liquor to three fluid ounces, and pouring it into half a gallon of water, decanting the supernatant fluid from the precipitate which subsides, washing the sediment by agitation with water, and drying on a filter at a temperature of 212°.

The solution of bismuth in nitric acid, when poured into water, lets fall Nitrate of Bismuth, now called in the Pharmacopœia, White Bismuth, formerly known as the tris-nitrate or sub-nitrate; the solution of Bismuth in nitric acid must, therefore, be considered as containing a ter-nitrate of the metal ($Bi\ O_3$, $3\ NO_5$).

Prop. & Comp. A heavy white powder sometimes pearly or crystalline. Composition ($Bi\ O_3$, NO_5), but a little water is contained in it when prepared as above directed: its composition is also somewhat altered by washing. It is insoluble in water, and blackened by sulphuretted hydrogen; dissolves without effervescence in nitric acid, and the solution poured into water gives a white crystalline precipitate; dissolved in sulphuric acid, diluted with an equal bulk of water, it forms a solution which is blackened by sulphate of iron, showing the presence of nitric acid.

Off. Prep. Trochisci Bismuthi. Bismuth Lozenges. [Not officinal in U. S. P.] (White bismuth, fourteen hundred and forty grains; carbonate of magnesia four ounces; precipitated carbonate of lime, six ounces; refined sugar, thirty ounces; gum arabic, in powder, one ounce; distilled water, six fluid ounces; oil of cinnamon, half a fluid drachm, for 720 square lozenges.) Each lozenge contains two grains of white bismuth.

Therapeutics. It acts as a sedative to the stomach and intestines and is used with great effect in pyrosis, and some forms of vomiting; also to restrain diarrhœa, especially when phthisical in character: its remote effects are not well made out. Externally it is stated to allay irritation, and it has been used in some chronic skin diseases. It is also employed as a cosmetic.

Dose. 5 gr. to 20 gr. in powder; or suspended by means of mucilage of gum arabic or tragacanth. Of the lozenges, from 2 upwards.

Adulteration. Carbonate of lead, a dangerous addition, known by the tests given above; this salt effervesces with nitric acid, and the solution is precipitated by sulphuric acid. Arsenic has been occasionally found in the salt, detected by the sublimation of arsenious acid when the preparation is heated, and by the other tests given under that metal.

Carbonate of Bismuth (not officinal), [Bismuthi Sub-carbonas Sub-carbonate of Bismuth. U. S.], which occurs in the form of a fine white powder, is sometimes used in medicine for the same purposes as the nitrate of bismuth; it is supposed to be more soluble in the stomach than the nitrate, and on that account has been preferred by some; this advantage is at the best a doubtful one, and clinical experience as to the comparative value of the two preparations of bismuth is still wanting. The dose is the same as that of the Nitrate.

CADMIUM.

(Cd. Eq.=56.)

Cadmium is a metal of a white color, resembling tin, and a bar of it creaks when it is bent in the same manner as tin. It is found as a sulphuret, in combination with some ores of zinc. Sp. gr. 8·6. None of the salts of cadmium are officinal.

Sulphate of Cadmium (Cd O, SO_3 + 4 HO) resembles in appearance sulphate of zinc; it is crystalline and soluble in water, in large doses it produces vomiting; it is said to possess antisyphilitic properties, and applied in solution topically acts as an astringent and irritant, and may be used for the same purposes as the sulphate of zinc. Its action is said, however, to be ten times more powerful.

Iodide of Cadmium (Cd I) [not officinal in U. S. P.], occurs in pearl-like crystalline scales; made into an ointment it forms an efficient preparation, which may be used in the same cases, and has the same action as the iodide of lead; while the staining which the latter salt produces is not produced by the cadmium salt; this renders the iodide of cadmium a more desirable remedy when we wish to avoid the production of the yellow disfiguration. Cadmium, when absorbed into the system, is not known to produce injurious effects, as is the case with lead. The ointment may

consist of from thirty to sixty grains rubbed up with an ounce of lard.

CALCIUM.

(Ca. Eq.=20.)

Calcium is the metallic base of lime; it occurs, when pure, as a white metal, which, when heated, oxidizes rapidly and is converted into lime.

Calx. Lime, recently prepared from Chalk.

Prep. Lime, or quick-lime, is made from chalk or carbonate of lime by strongly heating it, so as to drive off the carbonic acid.

Prop. & Comp. It occurs in whitish masses, quite white when pure; of a caustic taste; rapidly absorbing water and becoming hydrated or slaked; and also carbonic acid, and re-forming chalk. When two-thirds of its weight of water are poured upon it, it slakes rapidly with development of much heat, and is converted into a snow-white and very bulky powder. About 11 grains are dissolved by a pint of water at 60° Fah.; it is less soluble in boiling water; sugar greatly increases its solubility. The solution of lime has an alkaline reaction, and yields a white precipitate with oxalate of ammonia; it soon absorbs carbonic acid if exposed to the air. Lime, if previously slaked, dissolves in dilute hydrochloric acid without effervescence, and if this solution be evaporated to dryness, and the residue re-dissolved in water, only a very scanty precipitate forms on the addition of saccharated solution of lime.

Off. Prep. Calcis Hydras. Slaked Lime. Recently prepared lime slaked with water.

Liquor Calcis. Solution of Lime; Lime Water. (Slaked lime, two ounces; distilled water, one hundred and sixty ounces. Keep the solution in stoppered glass vessels; and when it is to be used, draw off the clear solution with a syphon.) Ten fluid ounces require for neutralization at least twenty measures of the volumetric solution of oxalic acid, which correspond to about five grains and a half of lime; or about half a grain to the ounce.

Liquor Calcis Saccharatus. Saccharated Solution of Lime. [Not officinal in U. S. P.] (Slaked lime, one ounce; refined

sugar, in powder, two ounces; distilled water, twenty fluid ounces.) Sp. gr., 1·052. One fluid ounce requires for neutralization 25·4 measures of the standard solution of oxalic acid, which correspond to 7·11 grains of lime.

Linimentum Calcis. Liniment of Lime. (Lime-water, olive oil, each, two fluid ounces; shake them together until they are mixed.) [Solution of lime, 8 fl. ounces; flax seed oil, 7 troy ounces. Mix them.]

Lime forms also a part of Potassa cum Calce, not now officinal.

Therapeutics. Lime is only given as liquor calcis, which acts as an antacid both on the intestinal canal, and, after absorption, on the blood and secretions. It differs, however, from potash and soda, in being astringent or desiccative, diminishing secretion, and hence is very useful in diarrhœa connected with acidity, and in some cases of dyspepsia; it has also been used in certain calculous affections. Externally applied, lime acts as a caustic, or much diluted, as a desiccative, and is applied to burns in the form of linimentum calcis.

Dose. Of liquor calcis, ½ fl. oz. to 2 fl. oz. or more, with milk, &c.; of liquor calcis saccharatus, 15 min. to 1 fl. drm.

Adulteration. Lime and liquor calcis are apt to contain carbonic acid and metallic impurities, which can be detected by the tests given above.

Calcis Carbonas Præcipitata. Precipitated Carbonate of Lime.

Prep. By precipitating a solution of chloride of calcium with carbonate of soda, collecting and drying at 212°.

Prop. & Comp. Ca O, CO_2. A white crystalline powder, in other respects corresponding with creta præparata.

Creta Præparata. Prepared Chalk. Chalk reduced to a very fine powder and elutriated.

Prop. & Comp. In white powder, or small friable masses, tasteless, insoluble in water; entirely soluble with effervescence, in dilute hydrochloric acid; the solution is not precipitated by sulphuretted hydrogen, nor, after boiling, by ammonia added in excess; saccharated solution of lime added to a neutral solution gives no or scarcely a trace of precipitate, indicating the absence

of silica, common metallic impurities, alumina, or magnesia. Composition (Ca O, CO_2).

Off. Prep. Mistura Cretæ. Chalk Mixture. (Prepared chalk, a quarter of an ounce; gum arabic, in powder, a quarter of an ounce; syrup, half a fluid ounce; cinnamon water, seven fluid ounces and a half.) [Prepared chalk, half a troy ounce; sugar, gum arabic, each, 120 grains; cinnamon water, water, each, four fluid ounces. U. S.]

Pulvis Cretæ Aromaticus. Aromatic Powder of Chalk. [Not officinal in U. S. P.]

Synonym. Confectio Aromatica. *Lond.*

(Prepared chalk, one pound; aromatic powder, three pounds.)

Pulvis Cretæ Aromaticus cum Opio. Aromatic Powder of Chalk and Opium. (Aromatic powder of chalk, nine ounces and three-quarters; opium in powder, a quarter of an ounce.) One grain of opium is contained in forty grains of this powder.

Chalk is contained in hydrargyrum cum cretâ, and also in trochisci bismuthi.

Therapeutics. Chalk acts as an antacid and astringent on the intestinal canal; a little becomes absorbed and produces the remote effects of lime. It is used chiefly in diarrhœa, alone or combined with other astringents and aromatics.

Dose. Of calcis carbonas præcipitata, and of creta præparata, 20 gr. to 60 gr.; of mist. cretæ, 1 fl. oz. to 2 fl. oz.; of pulv. cretæ aromaticus, ½ drm. to 1 drm.; of the pulvis cretæ aromaticus, cum opio, the dose depends on the amount of opium desirable to administer.

Adulteration. The same for chalk as for lime, detected by the above tests.

Calcii Chloridum. Chloride of Calcium. Appendix A.

Prep. By dissolving white marble or chalk in hydrochloric acid, evaporating to dryness, afterwards fusing the salt at a dull red heat, and preserving it in well-closed bottles.

Prop. & Comp. Chloride of calcium forms whitish crystalline semitransparent masses or fragments, with a bitter, acrid, saline taste, deliquescent, and very soluble in water, from which it can be crystallised; insoluble in alcohol. Composition of the crystalline

salt (Ca Cl + 6HO); of the fused salt prepared as directed in the Pharmacopœia (Ca Cl).

Therapeutics & Use. It is introduced into the Pharmacopœia on account of the power it possesses of absorbing water, and is employed in the preparation of chloroform, ether, &c.; it is used also in the rectification of spirit. As a medicine, chloride of calcium acts upon the glandular system, and was formerly used in scrofula; it also appears to possess the power of allaying certain forms of vomiting.

Dose. 10 gr. and upwards.

Off. Prep. Solution of Chloride of Calcium, Appendix B, contains one ounce of chloride of calcium to ten fluid ounces of distilled water. It is used as a test.

Solution (Saturated) of Chloride of Calcium, also contained in Appendix B. (Chloride of calcium, three hundred and thirty-six grains; distilled water, one fluid ounce.)

Calx Chlorata. Chlorinated Lime. [Calx chlorinata. U. S.]

Prep. By passing chlorine gas over hydrate of lime loosely spread out in a proper chamber or vessel until it is completely saturated.

Prop. & Comp. A whitish powder, having the odour of chlorine and an acrid taste; absorbs carbonic acid and water when exposed to the air, and at the same time gives off chlorine; it is only partly soluble in water, the solution being alkaline, and possessing bleaching properties; the addition of oxalic acid causes the rapid and copious evolution of chlorine, and the deposition of oxalate of lime. Composition, probably (Ca O, Cl O), or a hypochlorite of lime; but besides this compound, free lime, chloride of calcium, &c., are present. Ten grains mixed with 30 grains of iodide of potassium, and dissolved in 4 fluid ounces of water, produce, when acidulated with 2 fluid drachms of hydrochloric acid, a reddish solution requiring for the discharge of its colour at least 85 measures of the volumetric solution of hyposulphite of soda, which corresponds to about 11 grains of iodine, or a little more than 3 grains of chlorine.

Off. Prep. Liquor Calcis Chloratæ. Solution of Chlorinated Lime. (Not officinal in U. S. P.) (Chlorinated lime, one pound; distilled water, one hundred and sixty fluid ounces.) Sp. gr. 1·035.

One fluid drachm mixed with twenty grains of iodide of potassium dissolved in four fluid ounces of water, when acidulated with two fluid drachms of hydrochloric acid, gives a red solution requiring for the discharge of its colour forty-six measures of the volumetric solution of hyposulphite of soda, equivalent to 1·62 grains of chlorine.

Use. In the preparation of chloroform; also as a disinfectant agent to evolve chlorine: is not often given internally, or used externally, chlorinated or chlorated soda being usually substituted for it.

Calcis Phosphas Præcipitata. Precipitated Phosphate of Lime.

Prep. By dissolving bone ash in hydrochloric acid, precipitating the solution with ammonia, and drying at a temperature not exceeding 212°.

Prop. & Comp. A white powder insoluble in water, but soluble without effervescence in dilute nitric acid. The solution continues clear when an excess of acetate of soda is added to it, but lets fall a white precipitate on the addition of oxalate of ammonia, and perchloride of iron (oxalate of lime and phosphate of iron being respectively formed). Composition (3 Ca O, PO). Ten grains dissolve without effervescence in dilute hydrochloric acid. The solution yields with ammonia a white precipitate (phosphate of lime), insoluble in boiling potash, and when washed and dried weighing ten grains: the absence of effervescence proves that no carbonate is present, and the weight of the precipitate shows that the salt is pure.

Off. Prep. (Contained in Pulvis Antimonialis.)

Therapeutics. Scarcely given as a medicinal agent.

Plaster of Paris. Appendix B. Native Sulphate of Lime (Ca O, SO_3). Deprived of water by heat. It is used for making a test solution.

Off. Prep. Solution of Sulphate of Lime. Appendix B. A saturated solution of sulphate of lime.

CERIUM.

Some of the salts of cerium, a metal which exists in a few rare minerals, as cerite, have been made use of in medicine. The

oxide and the **oxalate of cerium** have been most frequently used, and occasionally the **nitrate** has been given. The cerium salts have been chiefly employed to allay vomiting, especially that which occurs in pregnancy, also in the vomiting of phthisis; and in some cases of epilepsy accompanied with gastric disturbance. The dose of the preparations of cerium may be from 3 to 5 grs.

COPPER.

(Cu. Eq. = 31·75.)

Cuprum. Copper. Appendix B. Copper, in the form of foil, thin and bright.

Prop. & Use. Metallic copper has a well-known peculiar red colour; sp. gr. 8·86; malleable and ductile; oxidizable in the air, especially when in contact with acids, alkalies, or fatty bodies: it is employed to test the purity of hydrochloric acid; it can also be used for the detection of silver, when put into a solution of a salt of silver; the latter metal is deposited upon it as a white powder. Mercury would also be precipitated, but may be distinguished from silver by its running into globules when rubbed. Copper is also employed in Reinsch's test for arsenic.

Sulphate of Copper of Commerce. Appendix A.

Cupri Sulphas. Sulphate of Copper (purified).

Sulphate of Copper (Anhydrous). Appendix B. Sulphate of copper deprived of its water by heat.

Prep. The native sulphuret of copper, called copper pyrites, when roasted with free access of air, oxidates, and forms the sulphate; the salt thus prepared, however, is very impure, containing, as the ore does, much iron, which, to a great extent, is removed by the process given in the Pharmacopœia for its purification, namely, by dissolving the sulphate in boiling distilled water, filtering, and setting aside to crystallize. The *Anhydrous Sulphate of Copper*, deprived of its water by a heat of 400°, (Cu O, SO_3) is a yellowish white powder, and is used only as a test.

Prop. & Comp. Sulphate of copper forms oblique rhombic azure-blue crystals, with a styptic metallic taste; efflorescing slightly in dry air; soluble in water; and reddening litmus. The aqueous solution gives a white precipitate with chloride of barium insoluble in hydrochloric acid, and a maroon-red precipi-

tate with ferrocyanide of potassium; it is also precipitated by ammonia, but re-dissolved in excess of the re-agent. Composition ($Cu\ O, SO_3 + 5\ HO$). A watery solution of the salt, to which twice its volume of the solution of chlorine has been added, when treated with an excess of ammonia, gives a clear sapphire-blue solution (from the formation of the ammonio-chloride), leaving nothing undissolved; this shows the absence of iron.

Therapeutics. Internally, in small doses, it is astringent to the alimentary canal; and after absorption, a tonic to the nervous system. In large doses, a quick and powerful emetic. Externally in powder, or in strong solution, it acts as an escharotic; in a more diluted form as a stimulant and astringent. It is given as an astringent in cases of obstinate diarrhœa and dysentery, also as a tonic in chorea and epilepsy; in some cases of narcotic poisoning, as an emetic. Externally it may be used to excessive granulations or ulcers, or to diminish excessive secretions from mucous membranes, as in ophthalmia, gleet, &c.

Dose. As an astringent or tonic, ¼ gr. to 2 gr.; as an emetic, 5 gr. to 8 gr. Externally, in substance or in solution, from 1 gr. to 10 gr., or more to the fl. oz.

Adulteration. Sulphate of iron in the commercial salt; sometimes sulphate of zinc is fraudulently added: the iron is detected by ammonia, not redissolving the oxide; zinc, by first precipitating the copper with sulphuretted hydrogen, then, on the addition of ammonia, some of the above gas being in solution, a whitish sulphuret of zinc is thrown down.

Solution of Ammonio-Sulphate of Copper. Appendix B.

Prep. (Sulphate of copper in crystals, half an ounce; solution of ammonia, a sufficiency; distilled water, a sufficiency. Dissolve the sulphate of copper in eight fluid ounces of the water, and to the solution add the ammonia until the precipitate first formed is nearly dissolved. Clear the solution by filtration, and then add distilled water, so that the bulk may be ten fluid ounces.) It is introduced as a test for the qualitative analysis of liquor ammoniæ fortior. Composition of the contained salt ($Cu\ O, SO_3 + 2\ NH_3, HO$). [Cuprum ammoniatum U. S. is prepared by rubbing together in a mortar ½ an ounce of sulphate of copper with 360 grs. of carbonate of ammonia and drying with bibulous paper.]

Subacetate of Copper of Commerce. Appendix B. Verdigris; Ærugo.

Prep. By exposing copper-plates to the action of the fermenting marc of grapes, or pyroligneous acid, when this salt forms on the surface.

Prop. & Comp. In powder or masses consisting of very minute crystals, of a bluish-green colour, with a peculiar sour metallic odour, and styptic metallic taste; resolved by water into a soluble acetate and insoluble tris-acetate; when treated with sulphuric acid, it gives off acetic acid fumes; it dissolves in this acid when dilute, and from the solution ammonia precipitates the oxide, but re-dissolves it when in excess. Composition ($2\ Cu\ O, \overline{A} + 6\ HO$).

A solution of acetate of copper is used for detecting the presence of butyric acid in valerianate of zinc. For this purpose the valerianate of zinc is distilled with sulphuric acid, and to the distillate the solution of copper is added; if any butyric acid be present a bluish-white precipitate of butyrate of copper is produced, but pure valerianic acid gives rise to no precipitate.

Therapeutics. Verdigris is used externally as an escharotic, in powder, or mixed with honey and vinegar, under the name of Linimentum Æruginis; it should be applied with a camel's-hair brush.

Adulteration. It sometimes contains chalk and sulphate of copper, detected by its effervescing with an acid, and by the solution precipitating with ammonia and chloride of barium. Other impurities can be detected by the tests given above.

FERRUM. IRON.

(Fe. Eq.=28.)

Iron Wire. Appendix A.

Iron wire is used in the Pharmacopœia for the formation of the iodide, the sulphate, and the granulated sulphate; and when thus employed, should be soft or wrought iron, which is flexible and non-resilient.

Ferrum Redactum. Reduced Iron. Metallic Iron in powder.

Synonym. Ferri Pulvis. *Dub.* Fer réduit.

Prep. Ordered to be made by reducing the peroxide of iron

to the metallic state, by heating it in a gun-barrel in a furnace, and passing through it hydrogen gas, previously rendered dry by having passed over sulphuric acid and chloride of calcium.

Prop. & Comp. An impalpable powder, of a steel-grey colour, strongly attracted by the magnet, and exhibiting metallic streaks when rubbed with firm pressure in a mortar; it is soluble in dilute hydrochloric acid, with effervescence from the evolution of hydrogen, and the solution gives a light-blue precipitate with the ferridcyanide of potassium; it oxidizes when exposed to damp air: it should be pure iron, but it usually contains some magnetic oxide and a little sulphuret of iron. Ten grains added to an aqueous solution of 50 grains of iodine and 50 grains of iodide of potassium, and digested with them in a small flask at a gentle heat, leave not more than 5 grains undissolved, and this should be entirely soluble in hydrochloric acid: this test indicates that at least one-half of the powder is metallic iron, as the magnetic oxide is not dissolved by the iodine solution.

Therapeutics. Reduced iron may be given when we desire the blood-restoring properties of the metal without any astringent action. It is a powerful hæmatinic even in small doses. It usually sits easily on the stomach; but occasionally annoys by causing the evolution of sulphuretted hydrogen.

Dose. Of reduced iron, 2 gr. to 6 gr. It may be taken with advantage with a meal.

Adulteration. Reduced iron is very apt to contain some sulphuret, from a subsulphate being thrown down with the oxide. Occasionally magnetic oxide has been mixed with or substituted for the reduced metal; the former impurity can be detected by the evolution of sulphuretted hydrogen when an acid is added; the latter by the want of effervescence or non-evolution of hydrogen, and the quantitative test above given.

Ferri Carbonas Saccharata. Saccharated Carbonate of Iron. [Not officinal in U. S. Ph.]

Prep. Made by decomposing a solution of the sulphate of iron, by means of carbonate of soda, collecting the precipitated carbonate on a filter, and having first subjected it to expression, rubbing it with sugar in a porcelain mortar, and drying at a temperature not exceeding 212°.

Prop. & Comp. The saccharated carbonate of iron consists of carbonate of iron (Fe O, CO_2), mixed with peroxide of iron and sugar; the carbonate should form at least 57 per cent. of the mixture. It occurs in small lumps of a grey-brown colour, and a sweet chalybeate taste, and dissolves with effervescence in warm hydrochloric acid diluted with half its volume of water, and this solution is but slightly affected by the ferrocyanide, but gives a copious blue precipitate with the ferridcyanide of potassium, showing that the salt of iron is mostly in the state of protoxide. Its solution in hydrochloric acid gives but a very slight precipitate with chloride of barium.

Twenty grains dissolved in excess of hydrochloric acid and diluted with water continue to give a blue precipitate with the ferridcyanide of potassium, until at least 33 measures of the volumetric solution of bichromate of potash have been added, indicating that 5·6 grains of protoxide are present.

Off. Prep. Mistura Ferri Composita. Compound mixture of Iron. (Powdered myrrh, sixty grains; carbonate of potash, twenty-five grains; rose-water, eight fluid ounces; sulphate of iron, thirty grains; spirit of nutmeg, one fluid drachm; sugar, sixty grains. Rub the myrrh with the spirit of nutmeg and the carbonate of potash: to these, while rubbing, add first the rose-water, with the sugar, then the sulphate. Put the mixture immediately into a glass vessel, and stop it.)

Pilula Ferri Carbonatis. Pill of Carbonate of Iron. (Saccharated carbonate of iron, one ounce; confection of roses, a quarter of an ounce. [U. S. Recently precipitated Carbonate of Iron made into a pill mass with clarified honey and sugar.] [U. S. Pilulæ Ferri Compositæ. Compound Pills of Iron. Myrrh, 120 grains; carbonate of soda, sulphate of iron, each sixty grains; made into a mass with syrup and divided into 80 pills.]

Therapeutics. The carbonate of iron in any of the above preparations has the properties of iron before noticed. (See also Part II.) The carbonate is not astringent, and produces little or no action upon the mucous membranes of the alimentary canal. It has enjoyed great repute in the form of mist. ferri comp., or Griffiths's mixture, as it was called, in the treatment of anæmic amenorrhœa.

Dose. Of ferri carbonas saccharata, 5 gr. to 20 gr. or more; of

mist. ferri comp., 1 fl. oz. to 2 fl. oz.; of pil. ferri carbonatis, 5 gr. to 20 gr. or more. [Of the compound pills of iron, one or two three times a day.] When the mixture has been kept many days, it becomes reddish-brown in colour, from the green carbonate being converted into the sesquioxide of iron. The sugar in the other two preparations preserves the salt from oxidation.

Ferri Iodidum. Iodide of Iron. [Not officinal in U. S. P.]

Prep. Made by dissolving iron wire and iodine in water with the aid of heat, and evaporating and allowing the product to solidify.

Prop. & Comp. Iodide of iron is crystalline; of a green colour, with a tinge of brown; when heated, it gives off violet vapours; very deliquescent; forms at first a greenish solution in water, which rapidly decomposes into free iodine and peroxide of iron: if an iron wire is kept in the solution, the strength remains the same, for, as the iodine becomes free, it dissolves the metallic iron and again forms the iodide. Formula, Fe I + 4 HO. It gives a copious blue precipitate with the ferridcyanide of potassium, and one of similar colour with mucilage of starch, on the addition of a minute quantity of chlorine. It is almost entirely soluble in water, leaving but a very small quantity of red sediment.

Off. Prep. Syrupus Ferri Iodidi. Syrup of Iodide of Iron. (Iodine, two ounces; iron, drawn into wire, one ounce; distilled water, thirteen fluid ounces, or as much as may be necessary; sugar, twenty-eight ounces. Mix the iodine and iron with three ounces of water and heat until the froth becomes white, then filter the liquid while still hot into the syrup which has been previously prepared by dissolving the sugar in ten ounces of water, and mix. The product should weigh two pounds eleven ounces, and should have the sp. gr. 1·385.)

Each fluid drachm of the syrup contains four grains and a-half of iodide of iron. [Made according to the U. S. P., a fluid drachm of the syrup contains about 7½ gr. of iodide of iron.]

Pilula Ferri Iodidi. Pill of Iodide of Iron. (Fine iron wire, forty grains: iodine, eighty grains; refined sugar, in powder, seventy grains; liquorice root, in powder, one hundred and forty grains; distilled water, fifty minims. Agitate the iron with the iodine and water in a strong stoppered ounce phial, until the froth

becomes white. Pour the fluid upon the sugar in a mortar, triturate briskly, and gradually add the liquorice.) One grain of iodide of iron is contained in about two grains and a-half of the pill. [In the U. S. P. the liquorice powder is replaced by marsh mallow and gum arabic powder, and the mass divided into pills containing each a grain of the iodide of iron.]

Therapeutics. Iodide of iron possesses the valuable properties of the ferruginous salts, in addition to those of iodine; it is peculiarly applicable to the treatment of scrofulous diseases in cachectic subjects requiring iron; it should be remembered that the proportion of iron to iodide is small, only as 1 to 4½.

Dose. Of iodide of iron, 1 gr. to 5 gr. or more. Of the syrup (containing about 4½ gr. of iodide of iron to 1 fl. drm.), 20 min. to 1 fl. drm. [Of the syrup of the U. S. P., from 15 to 30 minims.] Of the pill, 2½ gr. to 8 gr. or more.

Ferri Sulphas. Sulphate of Iron.

Ferri Sulphas Exsiccata. Dried Sulphate of Iron.

Ferri Sulphas Granulata. Granulated Sulphate of Iron. [Not officinal in the U. S. P.]

Prep. *Sulphate of Iron* is made by dissolving iron wire in sulphuric acid, and crystallizing the solution; the *Dried Sulphate of Iron* by exposing these crystals to a moderate heat for some time, and finally raising it to 400°, when the water is driven off; and the *Granulated Sulphate* is made by pouring the hot solution of sulphate of iron into rectified spirit, and stirring the mixture, so that the salt shall separate in minute granular crystals.

Prop. & Comp. Pure sulphate of iron crystallizes in light bluish-green rhomboidal prisms, having an astringent styptic taste; composition ($Fe\ O, SO_3 + 7\ HO$); it dissolves in about 1½ times its weight of cold water; is insoluble in alcohol; it generally contains a little persalt; the solution, when exposed, gradually becomes turbid, depositing a reddish-brown sediment of the peroxide; it gives a white precipitate with chloride of barium, and a nearly white one with ferridcyanide of potassium. The crystals should be free from opaque rust-coloured spots, and dissolve in water without leaving any ochry residue. The aqueous solution gives no precipitate with sulphuretted hydrogen. The granulated

sulphate occurs in small granular crystals, and has the composition and properties of the ordinary sulphate. Dried sulphate of iron forms a whitish powder, and has the formula, Fe O, SO_3+HO, as one equivalent of water is retained at all temperatures below 500° Fah.

Off. Prep. Solution of Sulphate of Iron. Appendix B. (Granulated sulphate of iron, ten grains; boiling distilled water, one ounce.) Used as a test. Sulphate of iron is also used in the preparation of mist. ferri comp.; but in this preparation the carbonate of iron is formed.

Therapeutics. The same as iron salts in general, but in addition it has a powerful astringent action. It may be employed when an astringent is required with iron, as in passive hæmorrhages and mucous discharges. It may also be used externally for its constricting powers.

Dose. Of the sulphate or granulated sulphate 2 gr. to 10 gr., in pill or solution recently prepared. Of the dried sulphate from 1 gr. to 5 gr. may be administered. As a medicinal agent, the granulated sulphate has no peculiar advantages, except that it is much less liable to become oxidized than the common sulphate.

Incompatibles. None of the soluble iron preparations should be given with vegetable infusions or tinctures containing tannin or gallic acids, as inky compounds are then formed, which, though efficient as medicines, are not agreeable to the patient.

Ferri Arsenias. Arseniate of Iron. [Not officinal in U. S. P.]

Prep. Made by precipitating a mixed solution of arseniate of soda (four parts) and acetate of soda (three parts) by a solution (of nine parts) of sulphate of iron; collecting and washing the precipitate. It should be dried by squeezing it in folds of linen in a screw-press, and afterwards exposing it on porous bricks in a warm-air chamber, whose temperature should not exceed 100°.

Prop. & Comp. Arseniate of iron is a tasteless amorphous powder, of a green colour, insoluble in water, but readily soluble in hydrochloric acid. It consists of arseniate of iron (3 Fe O, AsO_5) partially oxidated. Its solution gives a precipitate both with ferro- and ferridcyanide of potassium. A small quantity boiled with an excess of caustic soda and filtered, gives, when exactly neutralized

by nitric acid, a brick-red precipitate on the addition of a solution of nitrate of silver (arseniate of silver). The solution in hydrochloric acid when diluted gives no precipitate with chloride of barium (absence of sulphate).

Twenty grains, dissolved in excess of hydrochloric acid diluted with water, continue to give a blue precipitate with the ferridcyanide of potassium, until at least 17 measures of the volumetric solution of bichromate of potash have been added, corresponding to 2·8 grains of protoxide of iron. In this quantitative test, the protoxide of iron is converted into the peroxide, by the action of the bichromate of potash, and the solution ceases to strike a blue colour with the ferridcyanide of potassium when this conversion is complete. One equivalent of bichromate of potash is capable of converting 6 equivalents of iron from the state of a protosalt to that of a persalt. One hundred measures of the volumetric solution contain $\frac{1}{10}$ of an equivalent in grains of the bichromate, and are capable therefore of converting $\frac{1}{10}$ of 6 equivalents of iron from protoxide to peroxide.

Therapeutics. Arseniate of iron possesses the therapeutic properties of arsenic and iron, and is useful in the treatment of certain skin diseases occurring in anæmic states of the system.

Dose. $\frac{1}{10}$ to $\frac{1}{8}$ gr.

Ferri Phosphas. Phosphate of Iron.

Prep. In the same manner as the arseniate of iron, phosphate of soda being made use of in the place of arseniate of soda. (Sulphate of iron, three parts; phosphate of soda, two parts and a-half; acetate of soda, one part.) [Sulphate of iron, five parts; phosphate of soda, six parts. U. S.]

Prop. & Comp. The composition of the fresh salt is represented by the formula, 3 Fe O, PO_5, but it becomes partially peroxidated by keeping. It is a slate-blue amorphous powder, insoluble in water. Soluble in hydrochloric acid; the solution precipitates both with ferrocyanide and ferridcyanide of potassium, more abundantly with the latter (showing that both proto- and per-salt are present); when treated with tartaric acid and an excess of ammonia, and subsequently with the solution of ammonio-sulphate of magnesia, it lets fall a crystalline precipitate (indicating phos-

phoric acid). If digested in hydrochloric acid with a lamina of pure copper, a dark deposit does not form on the metal (absence of arsenic).

Off. Prep. Syrupus Ferri Phosphatis. Syrup of Phosphate of Iron. [Not officinal in U. S. P]. (Phosphate of Iron is prepared by precipitating a solution of two hundred and twenty-four grains of granulated sulphate of iron with a mixture of two hundred grains of phosphate, and seventy-four grains of acetate of soda, the precipitate is pressed strongly between folds of bibulous paper, and five fluid ounces and a-half of dilute phosphoric acid added; as soon as the precipitate is dissolved the solution is filtered; and the sugar added and dissolved without heat.)

One grain of the iron salt is contained in each fluid drachm of the syrup.

Therapeutics. The blue phosphate of iron was much used by the late Dr. Prout in the treatment of diabetes. It acts as a blood-restorer like the other preparations of iron, and has been recommended also in the treatment of rickets. The syrup is an agreeable form for its administration.

Dose. 5 gr. to 10 gr. Of the syrup, 1 fl. drm., and upwards.

Ferri Oxidum Magneticum. Magnetic Oxide of Iron. [Not officinal in U. S. P.]

Synonym. Ferri Oxidum Nigrum. *Edin.*

Prep. By dissolving two parts of sulphate of iron in water acidulated with sulphuric acid, and boiling this mixture with a little nitric acid, until on the sudden disengagement of ruddy vapours the liquid passes from a dark to a red colour; a solution of one part of sulphate of iron is then added, and subsequently a solution of soda: the whole boiled for a few minutes, the precipitate collected on a calico filter, washed and dried without heat in a confined portion of air over a capsule containing sulphuric acid.

In this process two parts of the sulphate of the protoxide are converted into a persalt by boiling with nitric acid, and to these one part of the solution of protoxide is added; so that on the addition of soda a mixture of peroxide and protoxide of iron is precipitated.

Prop. & Comp. Peroxide of iron ($Fe_2 O_3$), with about 9 per

cent. of the protoxide (Fe O), and 22 of water. It is a brownish-black powder, without taste, strongly magnetic, dissolves without effervescence in hydrochloric acid diluted with half its bulk of water, and this solution gives blue precipitates with the ferrocyanide, and the ferridcyanide of potassium. Twenty grains, moistened with nitric acid, and calcined at a low red heat, leave 15·8 grains of the peroxide of iron; the same quantity dissolved in hydrochloric acid continues to give a blue precipitate with the ferridcyanide of potassium, until 8·3 measures of the volumetric solution of bichromate of potash have been added, indicating about 1·4 grains of protoxide.

Therapeutics. It may be used for the same purposes as reduced iron; it is a cheaper preparation, but probably much less effectual.

Dose. 3 gr. to 5 gr., or more.

Ferri Peroxidum. Peroxide of Iron. [Not officinal in U. S. P.]

Prep. By drying the hydrated peroxide of iron, and reducing it to powder.

Prop. & Comp. A dark-brown powder, insoluble in water, but soluble in hydrochloric acid; diluted with half its volume of water, it forms a solution which gives a copious blue precipitate with ferrocyanide of potassium. The solution should give no precipitate with chloride of barium or with the ferridcyanide of potassium. Composition ($Fe_2 O_3$). It is often calcined to improve its colour, but this process injures it by diminishing the solubility.

Off. Prep. Emplastrum Ferri. Plaster of Iron. (Peroxide of iron, in fine powder, one ounce; Burgundy pitch, two ounces; litharge plaster, eight ounces).

Therapeutics. It is a non-irritating preparation of iron, and is useful when it is desirable to continue the use of iron for a long time, or to give it in large doses; it has been much administered in tic douloureux and other neuralgic affections. As an external application its value is very questionable.

Dose. 10 gr. to 60 gr., or more, in treacle or honey.

[Ferri sub carbonas, U. S. Made by precipitating a solution of the sulphate of iron with the carbonate of soda. In drying nearly

all the carbonate is changed into peroxide. The effects and the dose are the same as in the preceding preparation.]

Ferri Peroxidum Hydratum. Hydrated Peroxide of Iron.

Prep. Made by precipitating a solution of persulphate of iron with soda, collecting the precipitate on a calico filter, and preserving it, without drying, in a well-covered vessel. [In the U. S. P., ammonia is used to precipitate the iron and the washed precipitate is kept under water.]

Prop. & Comp. Hydrated peroxide of iron ($2\ Fe_2\ O\ 3\ HO$), with a variable amount of uncombined water. It is a pasty mass of reddish-brown colour, dissolving readily in hydrochloric acid, giving a copious blue precipitate with ferrocyanide of potassium. It is free from grittiness, and leaves on calcination about 12 per cent. of peroxide of iron.

Therapeutics. The hydrated peroxide is not given internally to produce the general effects of iron on the system, but has been used as an antidote in cases of arsenical poisoning. It is capable of converting arsenious acid, the form in which the poison is usually taken, into an insoluble arseniate of iron ($2\ Fe_2\ O_3 + As\ O_3 = 4\ Fe\ O + As\ O_5$).

Ferri Perchloridi Liquor. Solution of Perchloride of Iron. [Not officinal in U. S. P.]

Prep. Made by dissolving iron wire in hydrochloric acid, and subsequently peroxidising the iron by evaporating the solution with nitric acid, and afterwards diluting with water to the proper strength.

Prop. & Comp. Perchloride of iron in solution in water ($Fe_2\ Cl_3$). It forms an orange-brown solution, with a strong styptic taste; miscible with water and alcohol in all proportions. Diluted with water, it is precipitated white by chloride of barium, and blue by the ferrocyanide of potassium. Sp. gr. 1·338. A fluid drachm diluted with water, and precipitated with ammonia, yields a precipitate (peroxide of iron), which when washed and incinerated weighs 15·62 grs., indicating the presence of 31·728 grains of perchloride of iron in the fluid drachm.

Off. Prep. Tinctura Ferri Perchloridi. Tincture of Perchloride of Iron. (Solution of perchloride of Iron, five fluid

ounces ; rectified spirit, fifteen fluid ounces.) Sp. gr. 0·992. The tincture has one-fourth the strength of Tinctura Ferri Sesquichloridi. *Dub.* [Tinct. Ferri Chloridi. Tincture of the Chloride of Iron. U. S. Sp. gr. 0·990.]

Therapeutics. A most powerful astringent ferruginous preparation useful in passive hæmorrhages and other discharges. Seldom given simply as a blood-restorer.

Dose. Of the solution, 3 min. to 16 min. ; of the tincture, 10 min. to 40 min. or more.

Ferri Pernitratis Liquor. Solution of Pernitrate of Iron. [Liquor Ferri Nitratis. Solution of Nitrate of Iron. U. S.]

Prep. By dissolving iron wire in nitric acid and diluting to the proper strength. One ounce of iron wire with three fluid ounces of nitric acid are used in preparing thirty ounces of the solution.

Prop. & Comp. A clear solution of reddish-brown colour, slightly acid and astringent to the taste. It contains the pernitrate of iron ($Fe_2 O_3$, 3 NO_5) in solution in water. It gives a precipitate with the ferrocyanide, but not with the ferridcyanide of potassium. When to a little of it in a test tube half its volume of pure sulphuric acid is added, and then a solution of sulphate of iron is poured in, the whole assumes a dark-brown colour, showing the presence of nitric acid in the solution. Sp. gr. 1·107. [1·106 to 1·107. U. S.] One fluid drachm precipitated with ammonia yields 2·6 grains of peroxide, corresponding to 7·865 grains of pernitrate of iron.

Therapeutics. A powerful astringent tonic, and useful in the same cases as the perchloride. It has been much used in Dublin, and is recommended in some forms of diarrhœa in debilitated subjects, and in passive mucous discharges.

Dose. 30 min. to 1 fl. drm.

Solution of Persulphate of Iron. Appendix A.

[Liquor Ferri Tersulphatis. Solution of Tersulphate of Iron. U.S.]

Prep. By boiling a solution of protosulphate of iron and sulphuric acid with nitric acid, until all the proto- is converted into a per-sulphate.

Prop. & Comp. It forms a solution of a dark-red color, which exhibits the reactions of the persalts of iron. Sp. gr. 1·441. One fluid drachm yields with ammonia 11·44 grains of peroxide of iron.

Use. It is used in preparing other ferruginous salts, and is not given as a remedy. It would be highly astringent.

[Liquor Ferri Subsulphatis. Solution of Sub-sub-sulphate of Iron. Solution of persulphate of iron. Monsel's solution. U. S.

A troy ounce and thirty grains of sulphuric ; a troy ounce and three hundred grains of nitric acid ; and half a pint of distilled water are heated to the boiling point. Twelve ounces of sulphate of iron in powder is gradually added, and the whole is boiled until nitrous vapours are no longer perceptible and the colour is a deep ruby-red ; water is added to make it measure twelve fluid ounces. An inodorous, syrupy fluid of a ruby-red colour, and an intensely astringent taste. Sp. gr. 1·552.

A very powerful astringent, applied either diluted or of full strength. Given internally likewise as an astringent in doses of from 3 to 10 minims.]

Ferri Ammonio-Chloridum. Ammonio-Chloride of Iron. Not officinal.

Prep. Made by forming a perchloride of iron by dissolving the peroxide in hydrochloric acid, then adding hydrochlorate of ammonia in solution in water, evaporating to dryness, and afterwards rubbing the saline mass to powder.

Prop. and Comp. It occurs in small orange pulverulent grains of hydrochlorate of ammonia stained with the sesquichloride of iron, and is not a true chemical compound ; soluble in proof spirit and water ; and 100 grains of the salt made according to the London Pharmacopœia of 1851 contain about 15 grains of perchloride of iron, the remainder being hydrochlorate of ammonia.

Off. Prep. Tinctura Ferri Ammonio-Chloridi. Tincture of Ammonio-Chloride of Iron. *Lond.* 1851. (Ammonio-chloride of iron, four ounces and one hundred and seventy grains ; proof spirit, and distilled water, each half a pint. Dissolve and strain.) An ounce of this tincture, on the addition of potash, should yield 5·8 grains of sesquioxide of iron.

Therapeutics. As three-fourths of the weight of the ammonio-

chloride of iron is sal ammoniac, it may be regarded as a preparation of this latter salt, equally as one of iron. It may be given as an alterative as well as a tonic and astringent.

Dose. Of the salt, 5 gr. to 15 gr. ; of the tincture, 10 min. to ½ fl. drm.

Ferri et Ammoniæ Citras. Ammonio-Citrate of Iron.

Prep. The hydrated peroxide recently precipitated from the solution of the persulphate by means of ammonia is dissolved in a solution of citric acid by the aid of heat, the liquid neutralized by the addition of ammonia, and then evaporated to dryness in thin layers on flat porcelain or glass plates.

Prop. & Comp. It is not crystalline, but dries in garnet or hyacinth-red transparent scales ; soluble in water, and forming a neutral solution of a sweet and very light styptic taste. When incinerated with exposure to air it leaves 26·5 per cent. of peroxide of iron ; heated with solution of soda, it evolves ammonia ; when acidulated with hydrochloric acid it gives a copious precipitate with ferrocyanide of potassium, but none with the ferridcyanide. Its composition is not well known ; it contains, however, citrate of iron and ammonia : probable formula ($Fe_2 O_3$, $NH_4 O$, HO, $C_{12} H_5 O_{11}$ + 2 HO).

Therapeutics. As a blood-restorer it is a very effectual salt, and it possesses scarcely any astringency ; it may often be given when the stomach will not bear the more styptic preparations of iron.

Dose. 5 gr. and upwards.

Incompatibles. Tannin solutions strike black ; caustic alkalies precipitate the oxide.

[Ferri et Ammoniæ Sulphas. Sulphate of Iron and Ammonia. Ammonio Ferric Alum. U. S. Made by adding sulphate of ammonia to solution of tersulphate of iron and crystallizing.

In beautiful violet-tinted crystals. A good astringent and used as such in doses of from 3 to 6 grains.]

[Ferri et Ammoniæ Tartras. Tartrate of Iron and Ammonia. U. S. Prepared by adding recently precipitated hydrated peroxide of iron to a solution of bitartrate of ammonia, and evaporating. It occurs in transparent garnet-red scales of a saccharine

taste, and very soluble in water. It has little or no astringency, and may be given in doses of from 5 to 10 grains.]

Ferrum Tartaratum. Tartarated Iron; Tartarate of Iron and Potash.

Synonym. Ferri Potassio-Tartras (*Lond.* 1851). [Ferri et Potassæ Tartras. U. S.]

Prep. This is prepared by mixing the recently precipitated hydrated peroxide of iron with a solution of acid tartrate of potash, and digesting the mixture with repeated stirring for six hours, the temperature being always kept below 140°. The solution is afterwards allowed to cool, any undissolved precipitate removed, and the fluid poured in a thin layer on flat glass or porcelain plates, and evaporated to dryness at a temperature not exceeding 140°.

Prop. & Comp. As usually prepared, it forms garnet scales, having the physical characters of the ammonio-citrate; sparingly soluble in spirit; soluble in water, the solution is neutral: when acidulated with hydrochloric acid, it gives a copious blue precipitate with ferrocyanide of potassium, none with ferridcyanide. Boiled with a solution of soda, peroxide of iron separates, but no ammonia is evolved, and the filtered solution, when slightly acidulated by hydrochloric acid, gives as it cools a crystalline deposit (bitartrate of potash). Fifty grains incinerated at a red heat, the residue treated with hydrochloric acid, and after digesting with a little nitric acid, diluted with 4 fluid ounces of water, yields when super-saturated with ammonia 14·92 grains of peroxide of iron.

Off. Prep. Vinum Ferri. Iron Wine; Steel Wine. [Not officinal in U. S. P.] (Tartarated iron, one hundred and sixty grains; sherry, twenty fluid ounces). Each fluid drachm contains one grain of the salt.

Therapeutics. The action of the tartarated iron is exactly similar to that of the ammonio-citrate; it can be prescribed with alkaline preparations.

Dose. Of the salt, 5 gr. to 20 gr. Of iron wine, from 1 fl. drm. upwards for children, ½ fl. oz. and upwards for adults.

Ferri et Quiniæ Citras. Citrate of Iron and Quinia.

Prep. A mixture of the freshly precipitated peroxide and protoxide of iron (prepared by precipitating a solution of the persulphate and protosulphate of iron by means of soda) is dissolved in a solution of citric acid, and to this is added quinia (prepared by dissolving sulphate of quinia by the aid of a little hydrochloric acid in water, removing the sulphuric acid by means of chloride of barium, and precipitating the quinia by ammonia), and the liquid digested on a water bath till the alkaloid is dissolved. It is then evaporated in thin layers on porcelain or glass plates, in the manner directed for the ammonio-citrate.

Prop. & Comp. It occurs in thin scales of a golden-yellow colour, deliquescent, entirely soluble in cold water. The solution is slightly acid, and is precipitated reddish-brown by solution of soda, white by solution of ammonia, blue by the ferrocyanide and by the ferridcyanide of potassium, and greyish black by tannic acid.

Taste bitter and chalybeate. When completely burned with exposure to air, it leaves a residue which yields nothing to water (peroxide of iron). Fifty grains dissolved in 1 fluid ounce of water, and treated with a slight excess of ammonia, yield a precipitate of quinia, weighing when dried 8 grains. The precipitate is entirely soluble in ether, when burned leaves no residue, and when dissolved in a dilute acid and purified with a little animal charcoal yields a solution which turns the plane of polarisation strongly to the left. This test determines the amount, nature, and purity of the alkaloid. The salt contains citrate of the proto- and peroxides of iron united with citrate of quinia, and the amount of the alkaloid estimated as citrate of quinia is 25 per cent.

Therapeutics. This salt possesses the combined properties of both iron and quinine.

Dose. 5 gr. to 20 gr.

Adulterations. Deficiency of quinia, and substitution of cinchonia, &c., indicated by above tests.

HYDRARGYRUM. MERCURY.

(Hg. Eq.=100.)

Hydrargyrum. Mercury; Quicksilver.

Prep. Mercury is obtained chiefly from its sulphuret, native cinnabar, by distillation with iron; sometimes it is met with in its metallic state, sometimes combined with chlorine, &c. Mercury of Commerce, Appendix A, is ordered to be purified by redistillation and washing with dilute hydrochloric acid.

Prop. & Comp. When pure, mercury occurs as a brilliant white metallic liquid, becoming solid at −39° Fah.; sp. gr. 13·5; entirely vaporized by heat; and when small globules of it are rolled slowly upon a sheet of paper, not the least particle adheres; above 40° Fah. a slight vapour arises from it. It forms two classes of salts, proto- and persalts. It dissolves many metals, as tin, bismuth, zinc, silver, and gold, and forms amalgams with them.

Off. Prep. Liquid mercury is seldom used in medicine, but there are many preparations which owe their value to the presence of mercury in a very highly divided state, caused by long trituration with saccharine and greasy matters, or fine powders.

Hydrargyrum cum Creta. Mercury with Chalk. (Mercury, one ounce; prepared chalk, two ounces. [Mercury, three ounces; prepared chalk, five ounces. U. S.] Rub together until globules are no longer visible.)

Pilula Hydrargyri. Mercurial Pill. (Mercury, two ounces; confection of roses, three ounces; powdered liquorice root, one ounce. Rub the mercury with the confection until globules can no longer be seen; then, the liquorice being added, beat the whole together to form a mass.)

Emplastrum Hydrargyri. Mercurial Plaster. (Mercury, three ounces; olive oil, one fluid ounce; resin, one ounce; litharge plaster, six ounces. Melt the oil and resin, rub the mercury till globules disappear, then add the litharge plaster, previously liquified.)

Emplastrum Ammoniaci cum Hydrargyro. Ammoniac and Mercury Plaster. (Gum ammoniac, twelve ounces; mercury, three ounces; olive oil, one fluid drachm; sulphur, eight grains.)

Unguentum Hydrargyri. Mercurial Ointment. (Mercury, one pound; prepared lard, one pound; prepared suet, one ounce. [Mercury, twenty-four ounces; lard, suet, each twelve ounces. U. S.] Rubbed together thoroughly.)

Linimentum Hydrargyri. Liniment of Mercury. [Not officinal in U. S. P.] (Ointment of mercury, one ounce; solution of ammonia, and liniment of camphor, each one fluid ounce.)

Therapeutics. Liquid mercury, when taken into the stomach, appears to possess no action on the economy, and very large quantities, even pounds, have at times been swallowed without any particular symptoms being produced; now and then, however, the full effects of the metal have ensued, probably owing to partial oxidation and absorption. The vapour of mercury acts with great energy, as seen in the effects on artificers exposed to its influence; the same results may be produced by rubbing mercury in a very highly divided state upon the surface of the body, or taking it internally in a state of minute subdivision. Given in small doses, the first effects of mercurials are observed in the increase of various secretions; and hence sialagogue, cholagogue, diuretic, emmenagogue, and other properties have been ascribed to this mineral. Its sialagogue power is shown in the increase of the salivary fluid, and mucous secretions of the mouth, together with a peculiar condition of the gums and neighbouring parts; and as these are amongst the first, most constant, and most peculiar of the effects of mercurials, they are generally taken as guides during the administration of the drug, as to the propriety of increasing or diminishing the dose. The sialagogue effects are seldom desired for themselves.

The cholagogue and purgative action of mercurials is exhibited in the increase of the colouring matter and other principles of the bile in the evacuations from the bowels, which are at the same time more liquid in character from an excessive secretion from various other secreting glands, as the pancreas, and mucous membrane of the intestinal canal. The secretions of the kidneys are not unfrequently augmented, also the action of the skin, and occasionally the catamenial discharge; it seems probable, however, that many of these latter effects are not so much due to the direct action of the remedy on the secreting organs, as to the relief of certain morbid conditions of the system, which had given rise to

the imperfect performance of these functions. Mercurials cause also the absorption of morbid fluids, either from increasing the activity of the absorbent system, or preventing deposition. In whatever way mercury is administered it becomes absorbed into the blood, where it has been detected; and its presence has also been demonstrated in the milk, urine, saliva, sweat, bile, pus from ulcers; and in the various tissues of the body, as the bones, brain, serous and synovial membranes, cellular tissue, and lungs. Its action on the blood is not well made out; it diminishes the amount of globules, and has some influence on the quantity and quality of the fibrine. Mercurials are employed in the treatment of various diseases, among which the following are the most important.

In *internal congestions*, as of the liver, kidneys, &c.; to increase secretions, and hence relieve the vessels of the parts.

Acute inflammation of any part is often found to give way when the system is brought under the influence of mercury, probably from its power of increasing the secretions of the part, influencing the capillary circulation, and altering the condition of the blood; sthenic inflammations, with effusions of plastic lymph, are more controlled by the drug than those of an asthenic kind; serous membranes are more influenced than mucous membranes, and the parenchyma of the liver more than that of the lungs. In *chronic inflammations* mercurials often prove useful in removing the morbid products, such as induration, and fibrinous and other effusions.

Mercury is injurious in erythematous and scrofulous inflammations, and also in any of a low type.

In acute *rheumatism* mercurials are much employed by some practitioners; it is questionable whether they influence the duration of the disease, but they are generally considered to be useful in the peri- or endo-carditis, which is so frequently present.

In *dropsies* dependent on inflammation of serous membranes and hepatic disease mercurials are useful, but injurious when arising from granular disease of the kidneys.

In idiopathic *fevers* mercurials are often useful in keeping up the action of secreting organs and relieving congestions, but they appear to have no influence on the duration of the fever itself.

In *syphilis* mercurials at one time formed the sole remedy; at the present time they are not considered essential to the cure of

the affection, although employed in moderate quantities, both for the primary and secondary forms of the disease: it is probable that the terrible sequences of syphilis, formerly so commonly met with, were often as much dependent on the drug as on the disease itself.

Mercury is very commonly used as an alterative in chronic affections of almost every part of the system, and as a cholagogue purgative in cases of dyspepsia, &c., where the secretion of the liver is defective.

Externally employed, in the form of ointment, &c., mercurials produce a topical stimulant action, causing exalted action of the capillaries; they also become absorbed, and affect the system generally. They are used over indurated and chronically inflamed parts, and sometimes to introduce the mineral into the system.

Effects of over-doses, or the too great action of Mercurials.

Very profuse pytalism, swelling of the tongue and salivary glands, and the whole face, tumefaction and redness of the gums, ulceration of different parts of the mucous membrane of the mouth, loosening of the teeth, and even necrosis of the jaw. Occasionally the flow of saliva and buccal mucus amounts to some pints in the day.

Excessive purging, with very bilious stools.

Certain skin affections, as Eczema Mercuriale.

Inflammation of the periosteum and bone, of parts not connected with the mouth.

A low, febrile condition (mercurial erythism), accompanied with intense prostration of the vital powers.

Affections of the nervous system, such as neuralgic pains, partial paralysis (tremor mercurialis), and sometimes complete paralysis, and death; these symptoms are usually observed in those who are subject to the action of mercurial vapours.

Circumstances influencing the operation of Mercurials.

The age of the patient has great influence; children are much less affected than adults; still, care should be used in administering mercurials to young subjects, as very injurious results sometimes ensue.

Certain individuals appear to be able to resist completely the action of mercurials, others to be very susceptible of their influence; often such idiosyncrasies cannot be explained, but at times they depend on a diseased condition of the system.

The presence of acute sthenic inflammation gives a resisting power to the action of the mercurial preparations, whereas granular disease of the kidney, scrofula, and scorbutus, render the system very sensitive to mercury, and the drug should generally be avoided in such cases.

Dose. Of hydrargyrum cum cretâ, 5 gr. to 15 gr.; of pilula hydrargyri, 3 gr. to 10 gr.

The unguentum hydrargyri may be rubbed into a part where the skin is thin, as in the arm-pit or inner side of the thigh, in quantities varying from 30 gr. to 120 gr. The inunction should be continued till absorption has taken place.

Adulteration. Other metals, as lead, tin, zinc, and bismuth, are often found in a state of amalgamation with mercury, or dissolved in it: when such are present, the small globules leave a trail when rolled along a sheet of paper: zinc and tin are soluble in the hydrochloric acid, and lead and bismuth would not volatilize, and so could be detected: the process of purification by means of distillation and hydrochloric acid removes these impurities.

Calomelas. Calomel; Subchloride of Mercury. [Hydrargyri Chloridum Mite. Mild Chloride of Mercury. U. S.]

Synonym. Hydrargyri Chloridum. *Lond.*

Prep. Sulphate of mercury, ten ounces; mercury, by weight, seven ounces; chloride of sodium, dried, five ounces; distilled water, a sufficiency. The sulphate of mercury and the mercury are rubbed together with a little water until globules are no longer visible; then the chloride of sodium is well triturated with them and sublimed. In this process the sulphate of mercury is, by being rubbed with a second equivalent of the metal, reduced to a sulphate of the suboxide; and this last, by the action of the common salt, is converted into the subchloride of mercury, sulphate of soda being produced at the same time. The decompositions may be thus represented:

1st part of process, $Hg\ O, SO_3 + Hg = Hg_2\ O, SO_3$.

2d part of process, $Hg_2\ O, SO_3 + Na\ Cl = Na\ O, SO_3 + Hg_2\ Cl$.

Prop. & Comp. Calomel, when sublimed, occurs in cakes, with a crystalline structure; but as a drug it is met with in the form of a dull-white, heavy powder, rendered yellowish by trituration in a mortar, without odour or taste; sublimes with heat; it is blackened when treated with potash, and the clear supernatant fluid, acidulated with nitric acid, gives a copious white precipitate with nitrate of silver. When calomel is boiled or washed in water, this liquid should afterwards give no precipitate with nitrate of silver, lime-water, or sulphuretted hydrogen. Calomel is insoluble in water, spirit, or ether; by the action of nitric and hydrochloric acids, it is converted slowly into the chloride. It is entirely volatilized by a sufficient heat. Warm ether shaken with it in a bottle leaves, on evaporation, no residue.

Off. Prep. PILULA CALOMELANOS COMPOSITA. Compound Pill of Calomel. (Calomel and sulphurated antimony, each one ounce; guaiac resin, in powder, two ounces; castor oil, one fluid ounce.) One grain of calomel is contained in five grains of the pill mass. [Pilulæ Antimonii Compositæ. Compound Pills of Antimony. Plummer's Pills. U. S. Sulphurated antimony and mild chloride of mercury, each one hundred and twenty grains; guaiac and molasses, each half a troy ounce. Divided into two hundred and forty pills; each pill contains half a grain of the mild chloride of mercury.]

UNGUENTUM CALOMELANOS. Ointment of Calomel. [Not officinal in U. S. P.] (Calomel, eighty grains; prepared lard, one ounce.) About one grain of calomel is contained in forty grains of this ointment.

Therapeutics. Calomel when absorbed acts on the system in the manner noticed under Hydrargyrum. Its peculiarities are, that it produces little local irritant action; as a purgative, it increases the secretion of bile and other intestinal fluids: and hence forms a useful adjunct in affections of the liver, and obstructions to the portal circulation. It often produces in children the so-named calomel stools, or green-coloured fæces. The compound pill is employed chiefly as an alterative in chronic skin diseases, in which the antimony and guaiacum aid its operation.

The ointment is a clean and valuable local alterative application in some forms of skin disease; it can also be employed as an inunction.

Dose. Of calomel as a purgative, 2 gr. to 6 gr.; to affect the system, ½ gr. to 1 gr. or more, frequently repeated. Of pil. calomelanos comp., as an alterative, 5 gr. to 10 gr.

Adulteration. Calomel is apt to contain a trace of corrosive sublimate (chloride of mercury) formed in the process of preparation: this can be detected by the water in which it is boiled, exhibiting reactions with the tests above given. Intentional impurities, as carbonate of lead, sulphate or carbonate of baryta, &c., are not volatilized by heat, and the carbonates effervesce with acids.

Hydrargyrum Corrosivum Sublimatum. Corrosive Sublimate; Chloride of Mercury. [Hydrargyri Chloridum Corrosivum. Corrosive Chloride of Mercury. U. S.]

Synonym. Hydrargyri Bichloridum. *Lond.*

Prep. Sulphate of mercury, twenty ounces; chloride of sodium, dried, ten ounces; black oxide of manganese, in fine powder, one ounce. The sulphate and the chloride are reduced to fine powder, and then thoroughly mixed by trituration in a mortar with the oxide of manganese and the corrosive sublimate sublimed. When the sulphate of mercury is heated with the common salt, a double decomposition takes place; and chloride of mercury, and sulphate of soda are produced, as represented in the formula, $HgO, SO_3 + NaCl = NaO, SO_3 + HgCl$.

Prop. & Comp. Corrosive sublimate occurs in heavy white crystalline masses of a styptic and metallic taste. Composition ($HgCl$); soluble in about 20 parts of cold water; much more so in alcohol; soluble also in ether: melts and entirely sublimes when heated. Its watery solution is precipitated by alkalies and lime-water, of a red or yellowish colour (the oxide); when this precipitate is heated, it gives off oxygen, and runs into globules of metallic mercury: the solution of corrosive sublimate gives a white precipitate with ammonia, and a curdy white precipitate with nitrate of silver; it precipitates albumen, and forms with it a definite and very sparingly soluble compound. When heated, chloride of mercury sublimes without decomposition, leaving no residue. Hydrochlorate of ammonia increases the solvent power of water for corrosive sublimate.

Therapeutics. Corrosive sublimate is a very powerful irritant;

when taken in large doses, it causes burning at the epigastrium, vomiting and purging; applied to the skin, it acts as a corrosive. In very small doses it is useful as an alterative in chronic affections, syphilitic or not, as in scaly skin diseases, periosteal affections, &c.; externally, as a lotion, injection, gargle, or ointment, in chronic skin diseases, ulcerated sore throats, and chronic discharge from mucous membranes. All the ordinary effects of mercury may be produced by this salt.

Dose. $\frac{1}{20}$ gr. to $\frac{1}{4}$ gr. in solution or pill, with crumb of bread.

Incompatibles. In solution it precipitates most of the vegetable preparations which contain albumen, tannin, &c. It is also thrown down by alkalies, alkaline sulphurets, iodides, and tartar emetic. An iodide in excess redissolves the precipitate.

Hydrargyrum Ammoniatum. Ammoniated Mercury; Ammonio-Chloride of Mercury; White Precipitate of Mercury.

Synonym. Hydrargyri Ammonio-Chloridum. *Lond. Dub.*
Hydrargyri Præcipitatum Album. *Edin.*

Prep. Corrosive sublimate, three ounces; solution of ammonia, four ounces; distilled water, three pints. Dissolve the chloride in the water, aided by heat; to the solution, when it has cooled, add the ammonia, frequently shaking it. Collect the precipitated powder on a filter, and wash with distilled water until the liquid which passes through ceases to give a precipitate when dropped into a solution of nitrate of silver acidulated by nitric acid; lastly, dry it. When ammonia is added to a solution of corrosive sublimate, this peculiar compound, and not simply the oxide of mercury, is precipitated.

Prop. & Comp. A white, amorphous, heavy powder, usually in the form of small spiral cones from the wringing of the linen filters; when heated it sublimes; it is insoluble in water, alcohol, and ether; dissolves in hydrochloric acid without effervescence; and when heated with a solution of potash gives off vapours of ammonia, and becomes yellow from the formation of the oxide of mercury; and the resulting fluid, filtered and acidulated with nitric acid, gives a white precipitate with nitrate of silver. Boiled with a solution of chloride of tin, it becomes grey, and affords globules of metallic mercury. Its composition is represented by the formula, $NH_2\,Hg_2\,Cl$. It may be regarded as a

chloride of ammonium, in which two equivalents of hydrogen are replaced by two equivalents of mercury, or as a compound of chloride with amide of mercury ($Hg\ Cl_2+Hg,\ NH_2$). Some doubts exist as to its true chemical nature.

Off. Prep. Unguentum Hydrargyri Ammoniati. Ointment of Ammoniated Mercury.

Synonym. Unguentum Præcipitati Albi. *Edin.*

(Ammoniated mercury, sixty-four grains; simple ointment, one ounce.) [Ammoniated mercury, forty grains; ointment of lard, a troy ounce.]

Therapeutics. Never used internally; externally, it destroys pediculi, and acts as a stimulant application when used to chronic skin affections in the form of the ointment.

Adulteration. Chalk, carbonate of lead, plaster of Paris, &c.: these do not sublime when heated: the carbonates effervesce with acids.

Hydrargyri Iodidum Viride. Green Iodide of Mercury.

Prep. Mercury, by weight, one ounce; iodine, two hundred and seventy-eight grains; rectified spirit, as much as may be necessary. Rub the mercury and iodine together, gradually adding the spirit, until the globules are no longer visible. Dry the powder with a gentle heat as quickly as possible, access of light being prevented, and keep it in a black glass vessel well stoppered. Direct union takes place when mercury and iodine are brought into contact with each other in a highly-divided state, the spirit aids the union by its solvent action upon the iodine.

Prop. & Comp. When thus prepared it forms a dingy greenish-yellow powder; if carefully heated, in a test tube, it yields a yellow sublimate, which upon friction becomes red, while a globule of metallic mercury is left in the bottom of the tube. It is entirely volatilized by a heat under redness; it is insoluble in ether, in water, and also in a solution of chloride of sodium; it is apt to decompose with the formation of some red iodide of mercury. Composition ($Hg_2\ I$).

Therapeutics. Acts in a manner very similar to calomel, perhaps is less purgative, more readily affecting the system; it has been proposed in venereal diseases occurring in scrofulous habits.

Externally it is alterative, and useful in chronic skin diseases, rubbed up with lard in the form of an ointment.

Dose. 1 gr. to 3 gr.

Adulteration. It may contain a little red iodide of mercury, which is a powerful irritant; this is detected by being soluble in a solution of common salt, also in spirit.

Hydrargyrum Iodidum Rubrum. Red Iodide of Mercury.

Prep. Four ounces of corrosive sublimate, and five ounces of iodide of potassium, are dissolved separately in water, and the two solutions mixed; the red iodide is precipitated, and is separated by decantation and filtration, and afterwards washed and dried. This is a simple case of double decomposition, chloride of mercury and iodide of potassium becoming chloride of potassium and iodide of mercury ($Hg\ Cl + KI = Hg\ I + K\ Cl$).

Prop. & Comp. A crystalline powder of a fine bright vermilion colour, becoming yellow when heated over a lamp on a sheet of paper; almost insoluble in water, dissolves sparingly in alcohol, but freely in ether or in an aqueous solution of iodide of potassium. When digested with a solution of soda, it assumes a reddish-brown colour, and the fluid cleared by filtration and mixed with a solution of starch, gives a blue precipitate on being acidulated with nitric acid. Entirely volatilized by a heat under redness, and completely soluble in ether.

Off. Prep. Unguentum Hydrargyri Iodidi Rubri. Ointment of Red Iodide of Mercury. [Not officinal in U. S. P.] (Red iodide of mercury, in fine powder, sixteen grains; simple ointment, one ounce.) This ointment contains one-fourth as much red iodide of mercury as Unguentum Hydrargyri Iodidi Rubri. *Dub.*

Therapeutics. The red iodide closely resembles corrosive sublimate in its action upon the system, and is far more irritant than the green iodide. It is chiefly used as an external application in the form of ointment to enlarged glands, and periosteal nodes of a syphilitic nature, also in goïtre. Internally it may be administered in the same cases as corrosive sublimate.

Dose. $\frac{1}{12}$ gr. to $\frac{1}{3}$ gr.

Hydrargyri Oxidum Rubrum. Red Oxide of Mercury.

Synonym. Hydrargyri Nitrico-Oxidum. *Lond.*

Prep. Mercury by weight, eight ounces; nitric acid, three fluid ounces; distilled water, two fluid ounces. Dissolve half the mercury in the nitric acid diluted with the water, evaporate the solution to dryness, and triturate the dry salt thus obtained with the remainder of the mercury. Put this into a porcelain capsule, then apply a slow fire, and gradually increase it until acid vapour ceases to arise.

Prop. & Comp. Red shining crystalline scales, insoluble in water, but entirely soluble in hydrochloric acid. Composition (Hg O). Entirely volatilized by a heat under redness, being at the same time decomposed into mercury and oxygen. If this be done in a test tube no orange vapours should be given off, indicating the absence of nitric acid. The solution in hydrochloric acid gives a yellow precipitate with caustic potash in excess, and a white precipitate with solution of ammonia.

Off. Prep. Unguentum Hydrargyri Oxidi Rubri. Ointment of Red Oxide of Mercury. (Red oxide of mercury, in very fine powder, sixty-four grains; simple ointment, one ounce.) About one grain of oxide in twenty-eight grains of the ointment.

Therapeutics. Used externally only, as a powerful irritant and escharotic; applied as an ointment to the eye in ophthalmia, to indolent ulcers, &c.; as an escharotic, in powder, alone or mixed with sugar, to specks in the cornea, over excrescences, chancres, and fungous ulcers.

Adulteration. Brick-dust, red-lead, and other red powders, detected by not being volatile; some undecomposed nitrate of mercury may be present, and then red fumes are given off when heated; the nitrate is also soluble in water.

Hydrargyri Nitratis Liquor Acidus. Acid Solution of Nitrate of Mercury.

Prep. Mercury, four ounces; nitric acid, three fluid ounces and a quarter; distilled water, three fluid ounces. Mix the nitric acid and the water, and dissolve the mercury in the mixture without heat; afterwards boil gently for fifteen minutes, cool and preserve in a stoppered bottle.

[Liquor Hydrargyri Nitratis. Solution of Nitrate of Mercury.

U. S. Mercury, three troy ounces; nitric acid, five troy ounces; distilled water, six fl. drachms. Dissolve the mercury with the aid of a gentle heat, in the acid mixed with the water. Afterwards evaporate to seven troy ounces and a half. Sp. gr. 2·165.]

Prop. & Comp. Nitrate of Mercury (Hg O, NO_5) in solution in nitric acid. It forms a colourless, strongly acid solution, which gives a yellow precipitate with potash added in excess. If a crystal of sulphate of iron be dropped into it, in a little time the salt of iron and the liquid in its vicinity acquire a dark colour. Sp. gr. 2·246. A little of it dropped into hydrochloric acid when diluted with twice its volume of water gives no precipitate.

Off. Prep. Unguentum Hydrargyri Nitratis. Ointment of Nitrate of Mercury.

Synonym. Unguentum Citrinum. *Edin.*

(Mercury, by weight, four ounces; nitric acid, eight fluid ounces; prepared lard, fifteen ounces; olive oil, thirty-two fluid ounces. Dissolve the mercury in the nitric acid with the aid of a gentle heat, then add the solution to the lard and oil, previously melted together by a steam or water-bath, and mix thoroughly. If the mixture do not froth up, increase the heat till this occurs.)

Therapeutics. The acid solution of nitrate of mercury is a powerful caustic, and has been applied topically in some cancerous affections and in lupus. The ointment acts as a stimulant, and is used in skin affections, and especially in chronic inflammatory diseases of the eyes, as in Ophthalmia Tarsi, &c. The ointment can be diluted to any degree.

Dose. The acid solution is not intended for internal administration.

Hydrargyri Sulphuretum. (Not officinal.) [Hydrargyri Sulphuretum Rubrum. Red Sulphuret of Mercury. U. S.] Sulphuret of Mercury; Artificial Cinnabar, called in *London Pharmacopœia of* 1851, Hydrargyri Bisulphuretum.

Prep. Lond. Mix mercury and sulphur in equivalent proportions, melt them over a fire, and as soon as the mass swells remove the vessel and strongly cover it lest the mixture take fire; then rub the mass to powder and sublime it. When melted sul-

phur is brought in contact with mercury, direct union ensues, the compound is afterwards sublimed, and forms artificial cinnabar.

Prop. & Comp. Dark scarlet shining crystalline masses, forming, when powdered, a beautiful scarlet colour, known by the name of vermilion ; insoluble in water or alcohol. Volatilizes entirely when heated alone, but with potash it is reduced to metallic globules. Composition (Hg S).

Therapeutics. When the fumes are brought into contact with the surface of the body, the drug acts as a topical alterative and becomes absorbed, affecting the system the same as other mercurials ; probably, when heated in the air, it is decomposed, at least in part. It is used as a fumigation in some syphilitic skin diseases, as ecthyma ; also as an inhalation in venereal sore throat. Rarely or never used internally.

Dose. As a fumigating agent, 30 gr., heated on an iron plate and placed under the patient wrapped in a blanket ; or the vapours may be applied to the mouth and throat through a funnel.

Adulteration. Red-lead, red oxide of iron, and brick-dust, detected by not subliming ; occasionally red sulphuret of arsenic has been found, but this can be detected by heating with charcoal, when it gives off the garlic odour ; also by the other tests for arsenic.

Sulphate of Mercury. Appendix A.

Prep. Made by dissolving twenty ounces, by weight, of mercury, in twelve fluid ounces of sulphuric acid with the aid of heat ; and subsequently evaporating until a dry white salt remains.

Prop. & Comp. Sulphate of mercury forms a white crystalline powder, which is decomposed by the action of water, and rendered yellow, from the formation of a subsalt of mercury 3 Hg O, SO_3. Sulphate of mercury is entirely volatilized by heat. Its composition is represented by the formula, Hg O, SO_3.

Use. It is used in the preparation of corrosive sublimate and calomel, and not given as a remedy. The yellow subsulphate above mentioned, under the name of Turbith Mineral, has been employed as an errhine.

LITHIUM.

(L. Eq.=7.)

Lithium, the metallic base of lithia, does not exist native, but can be obtained from various minerals, as lepidolite, triphylline, &c., and derives its name from λίθος a stone, as it was supposed to exist only in the mineral kingdom. It is the lightest solid body known, floats on water and on naphtha, and has a density of 0.5936, it has a very small atomic or equivalent weight, only seven on the hydrogen scale. Its oxide (LO), which is a powerful base, forms crystallizable salts with the acids. The urate of lithia is much more soluble than that of potash or soda.

Lithiæ Carbonas. Carbonate of Lithia.

Prop. & Comp. Carbonate of lithia occurs in a white powder or in minute crystalline grains. It has an alkaline reaction, and is soluble in 100 parts of cold water; its solubility is increased by the presence of carbonic acid in the liquid; not soluble in alcohol. When treated with hydrochloric acid it dissolves with effervescence; the solution when evaporated to dryness leaves a residue of chloride of lithium. If this be dissolved in water, and a solution of phosphate of soda added, a precipitate of phosphate of lithia is formed (3 LO, PO_5). The composition of carbonate of lithia is (LO, CO_2).

Ten grains neutralized with sulphuric acid, and afterwards heated to redness, should leave 14·86 grains of dry sulphate of lithia; this when re-dissolved in distilled water yields no precipitate with oxalate of ammonia or solution of lime, showing the absence of lime or magnesia.

Therapeutics. From the small amount of lithia sufficient to form a salt with uric acid, and the much greater solubility of the salt, it follows that unless other circumstances interfere with their administration, the lithia salts must be valuable remedies when it is desirable to keep uric acid in solution during its transit through the urinary organs or prevent its deposition in the structures of the body. The carbonate of lithia acts as a diuretic, and in the same dose has a more powerful influence in rendering the urine alkaline than the corresponding salt of soda or potash. It may be given with great advantage in certain states of the system in which urate of soda is liable to be deposited in the tissues, as in gout, &c.

Dose. Of the carbonate, 3 gr. to 6 gr. The carbonate may be given in aërated water; free dilution aids its diuretic action.

Lithiæ Citras. Citrate of Lithia.

Prep. Made by dissolving fifty grains of carbonate of lithia in one fluid ounce of water containing ninety grains of citric acid, by the aid of heat, evaporating the solution till water ceases to escape, and the residue is converted into a viscid liquid. This is dried at a temperature of about 240°, pulverized and kept in a stoppered bottle.

Prop. & Comp. Citrate of lithia is a white amorphous powder, soluble in water; the citric acid is carbonized by heating the salt to redness, and the residue, neutralized with hydrochloric acid, and dissolved in alcohol, burns with a crimson flame. Twenty grains burned at a low red heat with free access of air leave 10·6 grains of white residue (carbonate of lithia).

Therapeutics. The citrate of lithia resembles the carbonate in its action.

Dose. 5 gr. to 10 gr.

MAGNESIUM.

(Mg. Eq.=12.)

Magnesium, the metallic base of the magnesian salts, does not exist native; when obtained artificially, it is a brilliant grey-coloured metal; sp. gr. 1·7; not readily oxidated except when heated in air, and it then forms the earth magnesia.

Magnesia. Magnesia; Protoxide of Magnesium.

Magnesia Levis. Light Magnesia.

Prep. Carbonate of magnesia, four ounces, burnt in a Cornish or Hessian crucible closed loosely by a lid, and exposed to a red heat, as long as a little of the powder taken from the centre, when cooled and dropped into dilute sulphuric acid, gives rise to effervescence. In preparing the light magnesia, the light carbonate is used. In this process the carbonate is converted into the oxide by the heat driving off the carbonic acid.

The light magnesia differs from magnesia only in its greater levity, the volumes corresponding to the same weight being in the ratio of three and a half to one.

Prop. & Comp. A white powder with scarcely any taste; almost insoluble in water, but when moistened gives a slight alkaline reaction to turmeric paper, turning it brown. It dissolves in hydrochloric acid without effervescence; and the solution when neutralized by a mixed solution of ammonia and hydrochlorate of ammonia gives a copious crystalline deposit when phosphate of soda is added (the ammonio-magnesian phosphate). Dissolved in nitric acid and neutralized with a mixture of ammonia and hydrochlorate of ammonia it does not give any precipitate with oxalate of ammonia or chloride of barium, showing the absence of any sulphate of lime, or carbonate of magnesia or lime. Composition (Mg O).

Off. Prep. Of magnesia levis.

Pulvis Rhei Compositus. Compound Powder of Rhubarb. (Rhubarb, in powder, two ounces; light magnesia, six ounces; ginger, in powder, one ounce.) This is also known as Gregory's Powder.

Therapeutics. In small doses magnesia acts first as an antacid upon the alimentary canal; then becomes absorbed, and renders the urine alkaline; the salts formed by the presence of any acid in the stomach, have a purgative tendency: in large doses it produces distinct purgative effects. It is used in acidity of the stomach and heartburn, and in affections connected with an increased excretion of uric acid, or urates: also as a purgative in acid conditions of the alimentary canal, especially in children. It should be given cautiously, as it is rather apt to form concretions in the intestines when taken for a lengthened period.

Dose. Of magnesia or magnesia levis: as an antacid, 10 gr. to 20 gr.; as a purgative or adjunct, 20 gr. to 60 gr.; of pulvis rhei compositus, 5 gr. to 10 gr. for young children; 60 gr. to 120 gr. for adults.

Adulteration. It is apt to contain a little sulphate, as the carbonate is prepared from the sulphate; also lime, the sulphate being usually obtained from dolomite, a magnesian limestone; lastly, some carbonate, from imperfect calcination: these can be all detected by the above tests.

Magnesiæ Carbonas. Carbonate of Magnesia.

Synonym. Magnesiæ Carbonas Ponderosum. *Dub.*

Magnesiæ Carbonas Levis. Light Carbonate of Magnesia.

Prep. Sulphate of magnesia, twelve ounces; carbonate of soda, twelve ounces; distilled water, a sufficiency. Dissolve the carbonate and sulphate separately, each in a pint of water; then mix the solutions, and evaporate the whole to perfect dryness, by means of a sand-bath; digest the residue for half an hour with two pints of water, collect the insoluble matter on a calico filter, and wash till the washings cease to give a precipitate with chloride of barium; then dry at a temperature not exceeding 212°.

The *light carbonate of magnesia* is prepared by dissolving the same quantities of the sulphate and carbonate in half a gallon of water, mixing the two solutions cold, and boiling the mixture in a porcelain dish for fifteen minutes, then transferring to a calico filter, and washing and drying at a heat not exceeding 212°.

In these processes double decomposition takes place, sulphate of magnesia and carbonate of soda being converted into sulphate of soda and carbonate of magnesia.

Prop. & Comp. A white powder with scarcely any taste; insoluble in water; neutral, or very slightly alkaline in reaction; soluble in dilute mineral acids, yielding solutions which, when first treated with hydrochlorate of ammonia, are not disturbed by the addition of an excess of solution of ammonia, but yield a copious crystalline precipitate upon the addition of phosphate of soda. With excess of hydrochloric acid it forms a clear solution in which chloride of barium causes no precipitate. Another portion of the solution supersaturated with ammonia gives no precipitate with oxalic acid, indicating the absence of sulphates, and of lime. Fifty grains calcined at a red heat are reduced to 22. Composition ($3\,(Mg\,O,\,CO_2+HO)+MgO,\,2\,HO$). It is not a simple carbonate; but a mixture of the carbonate and hydrate of magnesia; as magnesia when precipitated is incapable of retaining the whole of the carbonic acid. The light carbonate has the same composition, but is much lighter, and when examined under the microscope is found to be partly amorphous with numerous slender prisms intermixed.

Therapeutics. Acts the same as magnesia, with the exception of producing an evolution of carbonic acid when it meets with acid

in the alimentary canal, and hence sometimes produces uncomfortable distension.

Dose. 10 gr. to 20 gr. as an antacid; 20 gr. to 60 gr. as a purgative.

Adulteration. Lime and some sulphate may be present, as in the last preparation, detected by the above tests.

Magnesiæ Sulphas. Sulphate of Magnesia; Epsom Salts.

Prep. Generally made, at the present time, from dolomite, a magnesian lime-stone (consisting of the carbonates of lime and magnesia), by treating it with sulphuric acid, which dissolves out the magnesia, and leaves the lime in the form of an insoluble sulphate of lime. Formerly it was prepared from bittern, the residual liquor left after the crystallization of common salt from sea water.

Prop. & Comp. In 4 or 6-sided colourless prisms, with from 2 to 6 terminal planes; as generally sold it is in small acicular crystals; they should not deliquesce in the air, but have a tendency to effloresce; sulphate of magnesia is soluble in water; and the solution gives copious white precipitates with chloride of barium (sulphate of baryta), and with a mixed solution of ammonia, hydrochlorate of ammonia, and phosphate of soda (ammonio-magnesian phosphate). The salt should not give off hydrochloric acid fumes when treated with sulphuric acid. Its aqueous solution at ordinary temperatures is not precipitated by oxalate of ammonia, showing that no lime is present. The precipitate given by carbonate of soda, when obtained from a boiling solution of 100 grains of the salt, should, when washed, dried, and heated to redness, weigh 16·26 grains. Composition (Mg. O, SO_3+7 HO).

Off. Prep. Enema Magnesiæ Sulphatis. Enema of Sulphate of Magnesia. [Not officinal in U. S. P.]

Synonym. Enema Catharticum. *Edin. Dub.*

(Sulphate of magnesia, one ounce; olive oil, one fluid ounce; mucilage of starch, fifteen fluid ounces.)

Therapeutics. In ordinary doses it acts as a saline purgative, causing a pretty free secretion of watery fluid from the canal. In small doses, and freely diluted, it causes diuresis. Epsom salts are employed very frequently, either alone or in combination with

other purgatives; and are especially adapted to the treatment of febrile affections, and also where the portal system is congested: with the infusion of senna, sulphate of magnesia forms the ordinary black draught. The enema is used as a purgative.

Dose. As a purgative, 120 gr. to ½ oz., or more; in combination, from 60 gr. upwards; as a diuretic, 20 gr. to 60 gr.

Adulteration. When made from bittern it contains chloride of magnesium and sodium; it then deliquesces, and gives off hydrochloric acid fumes with sulphuric acid; it also precipitates nitrate of silver.

MANGANESIUM. MANGANESE.

(Mn. Eq.=27·5).

Black Oxide of Manganese. Binoxide of Manganese.

Prop. & Comp. Binoxide of manganese, called also black oxide of manganese, is found native, sometimes crystallized, sometimes amorphous; as met with in commerce it is a black heavy powder, devoid of odour and taste; yielding, when heated with hydrochloric acid, or with sulphuric acid and salt, chlorine gas. It consists of the metal manganese (which has some resemblance to iron) and oxygen. Formula ($Mn O_2$).

Use. In the preparation of Liquor Sodæ Chloratæ, and Liquor Chlori. It may be employed also as a source of oxygen by heating it alone, or with sulphuric acid.

Therapeutics. Manganese preparations have been occasionally employed in medicine: the sulphate of the protoxide, in large doses, as from sixty grains to one hundred and twenty grains, produces purgative effects, and by some is considered to increase the excretion of bile; in small doses this salt, as well as the carbonate, have been given, with the idea of improving the condition of the blood, in cases of anæmia; but its value has not as yet been satisfactorily established. The binoxide is not used in medicine.

PLATINUM.

(Pt. Eq.=98·5.)

Platinum, a heavy, dull, white metal; sp. gr. 21; not acted on by any acid, only by chlorine, or nitro-hydrochloric acid.

Solution of Bichloride of Platinum. Appendix B.

Prep. By dissolving platinum in aqua regia, with heat. A mixture of half a fluid ounce of nitric acid with three fluid ounces of hydrochloric acid, and two fluid ounces of distilled water, are poured upon a quarter of an ounce of platinum foil in a small flask, and digested, more of the acid mixed in the same proportion being added until the metal is dissolved. The solution is transferred to a porcelain capsule, a fluid drachm of hydrochloric acid added, and the whole evaporated on a water-bath until acid vapours cease to be given off. The residue is dissolved in five ounces of distilled water and preserved in a stoppered bottle.

Prop., Comp. & Use. The solution is of a dark reddish-yellow colour, is used as a test for potassium, forming with the chloride of that metal a sparingly soluble double salt, which distinguishes potash from soda salts. The composition of bichloride of platinum ($Pt Cl_2$). It also precipitates ammonia salts, and many of the alkaloids, as nicotine, &c.

PLUMBUM. LEAD.

(Pb. Eq.=103·5.)

Metallic lead is not employed in medicine; but when individuals are exposed for a long time to its influence, as by handling it, they exhibit symptoms of slow poisoning.

Lithargyrum. Litharge. Protoxide of Lead. [Plumbi Oxidum. Oxide of Lead. U. S.]

Synonym. Plumbi Oxidum. *Lond. Dub.*

Prep. It is usually made during the cupellation of lead ores containing silver, when the oxide becomes fused or semi-vitrified.

Prop. & Comp. Red or orange-red scales; almost entirely soluble in nitric or acetic acid, either solution when neutral giving a copious yellow precipitate with iodide of potassium. It dissolves without effervescence in nitric acid diluted with 6 volumes of water, and the solution when supersaturated with ammonia and then cleared by filtration does not exhibit a blue colour, indicating the absence of a carbonate or copper. The solution is precipitated black by sulphuretted hydrogen, white by caustic potash, and re-dissolved by it in excess. Composition (Pb O).

Off. Prep. Emplastrum Lithargyri. Litharge Plaster. [Emplastrum Plumbi. Plaster of Lead. U. S.]

Synonym. Emplastrum Plumbi. *Lond.*

(Oxide of lead, reduced to very fine powder, four pounds; olive oil, a gallon; water, seventy fluid ounces. Boil them together over a slow fire for four or five hours, constantly stirring, until the oil and oxide of lead unite into the consistence of a plaster; a little boiling water may be added, if that which was used at the first has evaporated before the end of the boiling.)

Therapeutics. Litharge is never given internally. The plaster, in which the lead exists in combination with margaric and oleic acids, is used as a mechanical support; it is less irritating than many other plasters, and perhaps slightly astringent.

Plumbi Iodidum. Iodide of Lead. (Not officinal.) [Officinal in U. S. P.]

Prep. Made by precipitating a clear solution of acetate of lead by means of iodide of potassium. In this process iodide of lead and acetate of potash are formed by double decomposition.

Prop. & Comp. Iodide of lead occurs in a yellow powder, or in crystalline scales, soluble in boiling water, forming a colourless solution, depositing crystals in cooling. Fuses and sublimes yellow, but soon gives off violet vapours from decomposition. Composition (Pb I). It is altered a little by light.

Off. Prep. Unguentum Plumbi Iodidi. Ointment of Iodide of Lead. (Iodide of lead, one ounce; lard, eight ounces. Rub them together.)

Therapeutics. Externally applied, iodide of lead acts as a mild stimulant, and has been used in the form of ointments to enlarged scrofulous joints, &c. It is seldom used internally, but has been given in scrofulous tumours.

Dose. ¼ gr. to 1 gr., or more.

Plumbi Acetas. Acetate of Lead; Sugar of Lead.

Prep. By dissolving litharge in dilute acetic acid, and subsequent evaporation and crystallization.

Prop. & Comp. Generally in white spongy-looking masses, composed of interlaced acicular crystals; it may be obtained in large, flat four-sided prisms; acetate of lead has a sweetish,

acetous odour, and sweet, metallic taste; effloresces slightly in the air; is soluble in water; the solution slightly reddens litmus; and is precipitated white by carbonate of soda, yellow by iodide of potassium, and black by sulphuretted hydrogen; treated with sulphuric acid, acetic vapours are given off. The solution in distilled water is clear, or has only a slight muddiness, which disappears on the addition of acetic acid: 38 grains dissolved in water require for complete precipitation 20 measures of the volumetric solution of oxalic acid, corresponding to 22·3 grains of oxide of lead. Composition ($Pb\,O, C_4\,H_3\,O_3 + 3\,HO$).

Off. Prep. PILULA PLUMBI CUM OPIO. Pill of Lead and Opium. [Not officinal in U. S. P.] (Acetate of lead, in fine powder, thirty-six grains; opium, in fine powder, six grains; confection of roses, six grains.) One grain of opium is contained in eight grains of the pill mass.

Therapeutics. Acetate of lead in small doses acts as a sedative and astringent, lessening morbid mucous discharges and hæmorrhages, and even diminishing the natural secretions; hence producing constipation, thirst, and a species of colic named Painters' or lead colic, accompanied by a peculiar blue line on the gums (a valuable diagnostic sign): when continued for some time, it renders the pulse smaller, and induces wasting of the body; it also produces an influence on the nervous system, shown by loss of power of the extensors of the hand, sometimes complete paralysis and apoplexy. The serious symptoms above described are, for the most part, brought on by contact with lead in various occupations, and not often by its employment as a medicine. Acetate of lead is much used in hæmorrhages from various organs, also in chronic diarrhœa and dysentery; in phthisis to check expectoration and excessive sweating. Externally it is sedative and astringent, and is sometimes used in skin affections and over inflamed parts.

Dose. ½ gr. to 3 gr., or more; of Pilula Plumbi cum Opio, 4 gr. to 8 gr.

Liquor Plumbi Subacetatis. Solution of Subacetate of Lead.

Prep. (Acetate of lead, five ounces; litharge, in powder, three ounces and a half; distilled water, twenty fluid ounces, or a sufficiency. Boil them together for half an hour, frequently stirring,

then filter ; and when the liquor is cold, add of distilled water as much as may be necessary, that it may accurately measure twenty fluid ounces. Let it be kept in well-closed vessels.) By the action of the litharge on acetate of lead, a sub-salt is formed, an additional amount of the oxide of lead entering into the composition of the salt.

Prop. & Comp. A clear colourless liquid, sp. gr. 1·26, with an alkaline reaction, and sweet, astringent, metallic taste ; it agrees with the acetate in most of its properties, except that it precipitates gum as well as mucilage from solution, forming an opaque white jelly. Sulphuric acid in excess gives a white precipitate of sulphate of lead, acetic acid being set free. Two fluid drachms require for perfect precipitation 27 measures of the volumetric solution of oxalic acid, corresponding to about 30 grains of oxide of lead. The composition of the salt contained in liquor plumbi subacetatis may be represented by the formula, $2\ Pb\ O, C_4\ H_3\ O_3$.

Off. Prep. Liquor Plumbi Subacetatis Dilutus. Dilute Solution of Subacetate of Lead. (Solution of subacetate of lead, two fluid drachms ; rectified spirit, two fluid drachms ; distilled water, nineteen fluid ounces and a half.) [Solution of subacetate of lead, three fluid drachms ; distilled water, a pint. U. S.]

Unguentum Plumbi Subacetatis. Ointment of Subacetate of Lead. [Not officinal in U. S. P.] (Solution of subacetate of lead, six fluid ounces ; camphor, sixty grains ; white wax, eight ounces ; olive oil, twenty fluid ounces.)

Therapeutics. Subacetate of lead acts as an astringent and sedative ; it is only used externally ; and in the form of the dilute solution, is most commonly employed when the topical action of lead is desired. The ointment is used for a similar purpose.

Plumbi Carbonas. Carbonate of Lead.

Prep. Often made by exposing sheets of metallic lead to the fumes of acetic and carbonic acids, from vinegar and spent tan.

Prop. & Comp. A heavy white powder insoluble in water, blackened by sulphuretted hydrogen. It is soluble with effervescence in dilute nitric acid, forming a solution which is pre-

cipitated yellow by iodide of potassium, and white by sulphuric acid; it dissolves entirely in acetic acid; the solution treated with sulphuretted hydrogen in excess, boiled and filtered, gives no precipitate with oxalate of ammonia. The composition of this salt is represented by the formula, 2 (Pb O, CO_2) + Pb O, HO.

Off. Prep. Unguentum Plumbi Carbonatis. Ointment of Carbonate of Lead. (Carbonate of lead, in powder, sixty-four grains; simple ointment, one ounce). [Carbonate of lead in very fine powder, eighty grains; ointment of lard, a troy ounce. U. S.]

Therapeutics. This salt is not used as an internal remedy; when applied externally, it acts as a local astringent and sedative, and may be used in the same cases as the subacetate. It may be employed either alone or mixed with starch, and powdered upon diseased surfaces; or it may be applied in the form of the ointment.

POTASSIUM.

(K. Eq.=39.)

This metal, called also Kalium, does not exist native, but can be obtained from potash salts; when pure, it has a metallic lead colour; sp. gr. 0·86; rapidly oxidizes, and is converted into the protoxide or potash, which is contained in the following preparations.

Liquor Potassæ. Solution of Potash.

Prep. Carbonate of potash, one pound; slaked lime, twelve ounces; distilled water, a gallon. Dissolve the carbonate in the water, and having heated the solution to the boiling point in a clean iron vessel, gradually mix it with the slaked lime, and continue the ebullition for ten minutes with constant stirring. Then set by, that the carbonate of lime may subside. Lastly, when the supernatant liquor has become perfectly clear, transfer it by means of a syphon to a well-stoppered green-glass vessel. In this process the lime, on account of its affinity for carbonic acid, abstracts it from the carbonate of potash, and thus carbonate of lime, which is insoluble, is precipitated, and potash remains in solution. [In the U. S. P. bicarbonate of potassa is employed instead of the carbonate, and the solution boiled till the excess of

carbonate acid is given out. It is then decomposed by lime as in the text. The resulting preparation is stronger than that of the Br. Ph. having a sp. gr. of 1·065, and containing five and eight tenths per cent. of hydrate of potassa.]

Prop. & Comp. Liquor potassæ is a colourless liquid, with intensely acrid and caustic taste; sp. gr., 1·058. One fluid ounce requires for neutralization 48·25 measures of the volumetric solution of oxalic acid, equivalent to 22·68 grains of potash (KO). It does not effervesce when added to an excess of hydrochloric acid, nor give a precipitate with lime or oxalate of ammonia, showing the absence of carbonic acid and lime; and after being heated with nitric acid in excess, and evaporated to dryness, the residue forms with water a nearly clear solution, which is only slightly precipitated by chloride of barium and nitrate of silver, and is rendered very slightly turbid by ammonia, showing that mere traces of sulphates, chlorides, metallic impurities, or alumina are present; it forms with bichloride of platinum, the yellow double salt (K Cl, Pt Cl_2). It injures glass containing lead by partially dissolving it; hence it is ordered to be kept in green-glass bottles.

Therapeutics. Liquor potassæ, in large doses and undiluted, is a violent caustic poison; but taken into the stomach in a diluted form it acts at first as a direct antacid, neutralizing any free acid in the stomach; it also produces a powerful sedative effect upon the mucous membrane. After absorption into the blood, it possesses the power of increasing the change of tissues in the body, acting as an alterative, especially on the glandular system and on the secreting and excreting organs: it, doubtless, renders the blood more alkaline, and the fibrin less plastic; but from the small amount which can be taken on account of its causticity, never produces alkalinity in the urine previously strongly acid. It is used as an antacid in dyspepsia, but in the inflammatory forms of this affection its value depends more upon its sedative powers: it is also used in skin affections, and is especially useful when they depend upon a morbid condition of the stomach, as seen in erythema and other cutaneous diseases. As a blood alterant, liquor potassæ has been employed in inflammation of serous membranes, attended with fibrinous depositions, as pleuritis, pericarditis, and periostitis, also in scrofula, syphilis, and chronic

rheumatism. Recently, however, iodide of potassium has replaced this medicine in a great measure as an alterative. Externally, when freely diluted, liquor potassæ may be employed as a wash in some chronic skin diseases.

Dose. 10 min. to 1 fl. drm., freely diluted.

Adulteration. Carbonate and sulphate of potash, chloride of potassium, and lime, all of which can be detected by the tests given above.

Potassa Caustica. Caustic Potash.

Synonym. Potassæ Hydras. *Lond.* Potassa. *Edin.*

Prep. Two pints of the solution of potash, are evaporated in a silver or clean iron vessel over a fire, until the ebullition being finished, the hydrate of potash liquefies: this is poured into proper moulds, and when it has solidified, and while it is still warm, put it into stoppered bottles.

Prop. & Comp. Caustic potash is usually moulded for medical purposes into small sticks about the size of a pencil, which should be white, but are often greenish, bluish, or reddish-brown from impurities; it quickly deliquesces when exposed to air, and, if pure, dissolves in rectified spirit; it dissolves animal tissues, forming a kind of soap with them; a watery solution acidulated by nitric acid, gives a yellow precipitate with bichloride of platinum, and scanty white precipitates with nitrate of silver and chloride of barium. Composition (HO, KO); the equivalent of water cannot be driven off by heat. Fifty-six grains dissolved in water leave only a trace of sediment, and require for neutralization at least 90 measures of the volumetric solution of oxalic acid, corresponding to 42·3 grains of potash.

Off. Prep. Liquor Potassæ, described above, contains caustic potash, and in the British Pharmacopœia is considered an officinal preparation of that substance.

Therapeutics. The hydrate of potash, and also its mixture with equal parts of lime (potassa cum calce), which is not now officinal, are used only externally, as caustics, for the formation of sloughs, for touching ulcers, &c.; the advantage of the latter depends on its being much less deliquescent: it is applied as a paste made with spirit.

Adulteration. The same as of liquor potassæ ; besides which, oxides of iron and alumina are often present; these are not soluble in spirit.

Potassæ Carbonas. Carbonate of Potash.

Prep. From pearl-ashes (made from the ashes of wood) by solution in a small amount of water and crystallization, in which process most of the other salts contained in the wood are left undissolved. By heating the crystallized bicarbonate to redness, a very pure dry carbonate of potash is obtained.

Prop. & Comp. Carbonate of potash forms small white and rather opaque crystalline grains, having a strong alkaline taste ; it deliquesces in the air, and is almost entirely soluble in water (quite so, if pure) ; insoluble in spirit, effervescing with dilute hydrochloric acid, and forming a solution with which bichloride of platinum gives a yellow precipitate ; when supersaturated with nitric acid and evaporated to dryness, the residue is almost entirely soluble in water, only a little silica remaining undissolved, and the solution is precipitated only faintly by chloride of barium or nitrate of silver. Composition ($KO, CO^2 + 2\ HO$). The salt loses about 21 per cent. of its weight when exposed to a red heat. 87 grains require for neutralization at least 98 measures of the volumetric solution of oxalic acid, equivalent to about 46 grains of potash. It should be kept in a well-stoppered bottle.

Therapeutics. Almost the same as of potash, but is much less caustic, and hence more of the alkali can be introduced into the system ; after absorption its effects are the same. Sometimes employed externally.

Dose. 10 gr. to 20 gr.

Adulteration. Sulphates and chlorides are very apt to be present ; detected by the tests above given.

Potassæ Bicarbonas. Bicarbonate of Potash.

Prep. Made by passing a stream of carbonic acid through a solution of the carbonate in water unto saturation, and subsequent crystallization.

Prop. & Comp. The bicarbonate occurs in large transparent

colourless rhombic prisms, not deliquescent, with a mild alkaline taste; soluble in about four times its weight of water. The solution, when cold, does not precipitate sulphate of magnesia; effervesces with nitric acid; and the supersaturated solution is not precipitated by chloride of barium, or scarcely by nitrate of silver. With dilute hydrochloric acid it forms a solution with which bichloride of platinum gives a yellow precipitate (double chloride of platinum and potassium). Composition (KO, HO, 2 CO_2). Fifty grains exposed to a low red heat leave 34½ grains of a white residue, which require for exact saturation 50 measures of the volumetric solution of oxalic acid, equivalent to 23·5 grains of potash.

Therapeutics. Bicarbonate of potash acts as a direct antacid, but does not produce the sedative effect of liquor potassæ upon the stomach; it may be taken in very large doses, and is readily absorbed. It renders the blood and urine, and probably many other secretions, strongly alkaline; hence it is a powerful alterative; the action of the kidneys is likewise often increased. It is used in dyspepsia as an antacid; also in urinary affections where there is excessive deposit of uric acid. Bicarbonate of potash may be also employed with great advantage in the treatment of inflammatory affections, as acute rheumatism, &c.

Dose. 10 gr. to 30 gr. as an antacid, &c.; in acute rheumatism, 30 gr. to 40 gr. every four hours, freely diluted with water.

Adulteration. It is apt to contain carbonate of potash, which can be detected by its precipitating sulphate of magnesia.

Potassæ Acetas. Acetate of Potash.

Prep. Acetic acid, forty ounces, or a sufficiency; carbonate of potash, twenty ounces. To the acetic acid, placed in a thin porcelain basin, add gradually the carbonate of potash; then strain; if necessary add a few additional drops of acetic acid; evaporate the liquor until the salt is dried; then raise the heat cautiously so as to liquefy the product. Allow the basin to cool; and when the salt has solidified, and while it is still warm, break it in fragments and put into stoppered bottles. Simply a substitution of acetic for carbonic acid, which comes off with effervescence.

Prop. & Comp. Foliated satiny masses, this appearance being caused by the crystallization after fusion; neutral in reaction, and deliquescent; very soluble in water, also in alcohol. The solution of acetate of potash in water should not be precipitated by chloride of barium or nitrate of silver; or if the silver salt does precipitate it, this is again dissolved by water or dilute nitric acid. With a watery solution of the salt, tartaric acid causes a crystalline precipitate (bitartrate of potash), and a dilute solution of perchloride of iron strikes a blood-red colour. The solution is unaffected by hydrosulphuret of ammonia. With sulphuric acid it gives off vapours of acetic acid, and yields 88·8 per cent. of sulphate of potash. Composition ($KO, C_4 H_3 O_3$).

Therapeutics. When taken internally in moderate doses and diluted it becomes absorbed, and the acetic acid, being destroyed or burnt off in the blood, appears in the urine as carbonate, rendering that fluid alkaline, and often increasing the secretion; in large doses and concentrated, it produces a slight purgative action. It is used chiefly for its diuretic action, in various forms of dropsies: sometimes to produce the alkaline effects on the blood and secretions.

Dose. 10 gr. to 60 gr. as a diuretic; as a purgative, 120 gr., upwards.

Adulteration. It may contain traces of sulphates and chlorides, detected by the above tests. Acetate of silver is rather insoluble, and hence may be precipitated if the solution is very concentrated.

Potassæ Citras. Citrate of Potash.

Prep. By neutralizing carbonate of potash with citric acid, when carbonic acid gas is liberated and citrate of potash formed, each equivalent of citric acid decomposing three equivalents of the carbonate of potash, citric acid being tribasic.

Prop. & Comp. A white deliquescent crystalline powder, very soluble in water, feebly acid in taste. Composition ($3\,KO, C_{12} H_5 O_{11}$). Heated with sulphuric acid, it forms a brown fluid, gives off an inflammable gas, and evolves the odour of acetic acid. Its solution, mixed with a solution of chloride of calcium, remains clear till it is boiled, when a white precipitate separates (citrate of lime), readily soluble in acetic acid. Its solution acidulated with hydrochloric acid gives a yellow precipitate with bichloride of

platinum : 102 grains heated to redness till gases cease to be evolved, leave an alkaline residue (carbonate of potash) which requires for exact saturation 100 measures of the volumetric solution of oxalic acid, corresponding to 47 grains of potash.

Therapeutics. Citrate of potash sits easily upon the stomach, and is more pleasant to the taste, more readily absorbed into the system, and less liable to purge than the other vegetable salts of potash. It is a valuable saline febrifuge, increasing the secretion from the kidneys. The citrate is readily decomposed after absorption into the blood, reduced to a state of carbonate of the base, and in this state is eliminated in the urine, rendering this fluid less acid or even alkaline in reaction. It is thus an indirect alkaline remedy, although in the stomach it possesses no antacid properties. It may be used with advantage in cases of uric acid gravel and allied diseases.

Dose. 20 gr. to 60 gr.

Potassæ Tartras. Tartrate of Potash.

Prep. Made by boiling the acid or bitartrate with carbonate of potash, when an equivalent of water in the acid salt is replaced by one of potash, and carbonic acid given off.

Prop. & Comp. Small granular crystals, usually without distinguishable shape ; its real form is a right rhombic prism ; neutral, deliquescent, and very soluble in water ; bitartrate of potash is precipitated on the addition of hydrochloric acid to the solution. Heated with sulphuric acid it forms a black tarry fluid, evolving inflammable gas, and the odour of burned sugar. It is entirely dissolved by its own weight of water. 113 grains heated to redness, till gases cease to be evolved, leave an alkaline residue, which requires for exact saturation 100 measures of the volumetric solution of oxalic acid, equivalent to 47 grains of potash. Composition ($2\ KO, C_8\ H_4\ O_{10}$), tartaric acid being bibasic.

Therapeutics. In small doses it acts as a diuretic, and is changed into the carbonate in the same way as the acetate : in larger doses it is purgative, producing watery evacuations.

Doses. As a diuretic and alterative, 20 gr. to 60 gr. ; as a purgative, 120 gr. to 200 gr.

Adulteration. Some sulphates may be present, which may be detected by the tests already given for them.

Potassæ Tartras Acida. Acid Tartrate of Potash. (Cream of Tartar, crystallized.)

Synonym. Potassæ Bitartras.

Prep. From argol, the deposit which occurs on the inside of wine-casks, by purification with charcoal and clay. It is called cream of tartar, from the purest crystals being skimmed off the saturated solution while evaporating.

Prop. & Comp. Cream of tartar occurs as a very fine, gritty, white powder: or in fragments of cakes crystallized on one surface; or in small oblique rhombic prisms; acid, slightly soluble in water; but insoluble in spirit. Composition (HO, KO, C_8 H_4 O_{10}). Heated in a crucible, it evolves inflammable gas and the odour of burned sugar, and leaves a black residue (carbonate of potash and carbon), which effervesces with dilute hydrochloric acid, and forms a solution which, when filtered gives a yellow precipitate with bichloride of platinum, and when neutralised by ammonia is rendered slightly turbid by oxalic acid: 188 grains, heated to redness till gas ceases to be evolved, leave an alkaline residue, which requires for exact saturation 100 measures of the volumetric solution of oxalic acid, equivalent to 47 grains of potash.

Off. Prep. Contained in Pulv. Jalapæ Comp., and Confectio Sulphuris.

Therapeutics. In small doses, refrigerant and somewhat diuretic; in larger doses, a powerful hydragogue purgative, without producing much depression. Employed to form an acid drink in febrile and dropsical affections, and as a purgative in dropsies, depending upon renal or cardiac disease.

Dose. As a refrigerant or diuretic, 20 gr. to 60 gr.; and as a hydragogue purgative, 120 gr. to 300 gr.

Adulteration. Often contains a little tartrate of lime.

Potassæ Sulphas. Sulphate of Potash.

Prep. From the residuum of the distillation of nitric acid when made by treating nitre with sulphuric acid, which consists of bisulphate of potash (KO, HO, 2 SO_3), not quite pure. This

is dissolved in water, and to the solution slaked lime is added until it is alkaline in reaction. The solution is then filtered, heated to the boiling point, and carbonate of potash added as long as there is any precipitate. It is then refiltered, dilute sulphuric acid added, so as to produce a neutral or slightly acid solution, evaporated till a film forms on the surface, and then set aside to crystallize.

In this process, the excess of sulphuric acid in the residue of the nitric acid process (which is a bisulphate of potash, KO, HO, 2 SO_3), is removed in the form of sulphate of lime, by rendering the solution slightly alkaline with slaked lime. The excess of lime is afterwards got rid of by the addition of carbonate of potash, and to the filtered fluid dilute sulphuric acid is added so as to produce a neutral or slightly acid solution (this ensures all the carbonate of potash present being converted into sulphate), and the sulphate of potash is allowed after evaporation to crystallize out.

Much of the sulphuric acid is here lost in combination with the lime, but as the large scale on which nitric acid is manufactured renders the residue of the nitric acid process very cheap, it is probably found more economical to sacrifice some of the sulphuric acid than to procure more sulphate of potash by the addition of carbonate of potash, which is expensive in comparison to the value of the salt produced.

Prop. & Comp. Hard semitransparent crystals, six-sided prisms, terminated by corresponding pyramids; of a bitter saline taste, and slightly soluble in water. Its solution, acidulated with hydrochloric acid, is precipitated yellow by bichloride of platinum, and white by chloride of barium. Crepitates and afterwards fuses at a red heat without losing weight. Yields 132 per cent. of sulphate of baryta. Composition (KO, SO_3). The watery solution is neutral to test paper, and is not affected by oxalate of ammonia.

Off. Prep. It is contained in Pulv. Ipecacuanhæ cum Opio.

Therapeutics. Mildly purgative. Almost always given in combination; by some it is supposed to be alterative, acting on the secreting and excreting organs; latterly, evidence has been given of its acting as a poison in large doses. It is often

used on account of its mechanical properties for the purpose of more intimately dividing vegetable substances.

Dose. 20 gr. to 120 gr. as a purgative; in smaller doses as an alterative.

Potassæ Nitras. Nitrate of Potash; Nitre.

Prep. Certain soils in India contain nitrates of lime and potash; these, by being treated with wood ashes (carbonate of potash), yield nitrate of potash and carbonate of lime; the former is dissolved out and crystallized, and purified by re-solution and crystallization.

Prop. & Comp. Nitrate of potash forms six-sided prisms, transparent, striated, with a peculiarly cooling taste, soluble in water, not precipitated by chloride of barium or nitrate of silver; it fuses, but does not lose weight unless the heat is intense, when it gives off oxygen, and is converted into nitrite of potash, which last yields nitrous vapours when treated with sulphuric acid; deflagrates with heated charcoal, and forms carbonate of potash; when treated with sulphuric acid, it yields 85 per cent. of sulphate of potash; warmed in a test tube with sulphuric acid and copper filings, it evolves ruddy fumes (peroxide of nitrogen). Nitric acid can also be shown to be present by dissolving the salt in a little water, adding an equal bulk of sulphuric acid, and afterwards, when the mixture has cooled, a few drops of a solution of protosulphate of iron; a dark olive colour is produced, which is very characteristic. The solution acidulated with hydrochloric acid, gives a yellow precipitate with bichloride of platinum.

Therapeutics. Nitre is refrigerant and diuretic, it also produces some alteration in the condition of the blood, and a powerful sedative action upon the heart and vascular system. It is used in small doses as a refrigerant and diuretic in febrile affections, and to allay irritation of the mucous membrane of the stomach in inflammatory forms of dyspepsia; in large doses, as a vascular sedative in febrile affections, and especially in acute rheumatism. In dropsical affections, its action on the kidneys has sometimes proved useful.

Dose. 5 gr. to 20 gr. as a refrigerant and diuretic; 20 gr. to 30 gr. as a vascular sedative.

Adulteration. It may contain traces of sulphate or chloride; detected by chloride of barium and nitrate of silver: lime, if present, would yield a precipitate with oxalate of ammonia.

Potassæ Chloras. Chlorate of Potash, formerly called Oxymuriate of Potash.

Prep. By passing a stream of chlorine gas through a mixture of carbonate of potash and slaked lime; when saturation has taken place, chlorate of potash and chloride of potassium are formed; the former readily crystallizing out on account of its sparing solubility.

Prop. & Comp. Colourless transparent tabular crystals with four or six sides; have a cooling taste; sparingly soluble in water, especially when cold: the solution gives no precipitate with nitrate of silver; when a few drops of sulphuric acid are dropped upon the crystals, they become orange-red, and give off yellow vapours of peroxide of chlorine; when the salt is rubbed with sulphur in a mortar, it detonates. Composition ($KO, Cl O_5$); when heated, it first liquefies and then gives off nearly 39 per cent. of oxygen, and leaves a white residue, chloride of potassium (K Cl), readily forming with water a neutral solution, which is precipitated white by nitrate of silver, and yellow by bichloride of platinum. The solution of chlorate of potash is not affected by nitrate of silver or oxalate of ammonia.

Therapeutics. Chlorate of potash acts as a refrigerant and diuretic, in a manner similar to nitre; it has been supposed to give oxygen to the system, but this is doubtful: it has, however, been employed in low fevers, as scarlatina maligna, typhus and typhoid fevers, also in cancrum oris and other sloughing ulcers about the mouth and fauces.

Dose. 10 gr. to 20 gr., or more. About 16 parts of cold water dissolve 1 part of the salt.

Adulteration. Chloride of potassium may be present; detected by nitrate of silver.

Potassæ Permanganas. Permanganate of Potash.

Prep. Chlorate of potash and oxide of manganese, in fine powder, are mixed together; caustic potash, dissolved in a small quantity of water, is added, and the whole evaporated to dryness,

and then exposed to a dull red heat for an hour, till it has assumed the condition of a semi-fused mass. This mass is pulverized, boiled with water, and the liquid decanted, and accurately neutralized with sulphuric acid ; it is then evaporated, and the permanganate allowed to crystallize.

Prop. & Comp. Permanganate of potash occurs in the form of red or dark purple acicular crystals, sometimes reflecting a metallic green colour, and having a sweet astringent taste. A single small crystal is sufficient to colour an ounce of water deep purple, which, when mixed with a little rectified spirit and heated, is changed to a yellowish brown. This is due to the deoxidation of the acid by the organic matter and its reduction to the state of binoxide of manganese. The crystals evolve oxygen gas when heated, and leave a black residue in which the presence of potash may be detected by the usual tests. Five grains dissolved in water, require for complete decoloration a solution of 44 grains of granulated sulphate of iron, acidulated with 2 fluid drachms of dilute sulphuric acid. In this decomposition, the sulphate of the protoxide of iron absorbs oxygen from the permanganate, and becomes converted into a per-salt with the aid of the additional sulphuric acid present.

Off. Prep. Liquor Potassæ Permanganatis. Solution of Permanganate of Potash. [Not officinal in U. S. P.] (Permanganate of potash, four grains ; distilled water, one fluid ounce.)

Therapeutics. Permanganate of potash is a powerful anti-septic agent, and as such can be employed with much advantage in the form of a gargle or lotion to remove decomposing matter and clean diseased surfaces. Administered internally, it has been proposed as a remedy in diabetes.

Dose. 1 gr. to 4 gr. if given internally. Externally, 1 fl. drm. of the solution to 5 or 10 oz. of water.

Bichromate of Potash. Appendix A.

Prop. & Comp. Bichromate of potash is met with in large red transparent four-sided tables. It is soluble in water ; the aqueous solution gives with chloride of barium a yellowish-white precipitate (chromate of baryta), and with nitrate of silver an orange precipitate (chromate of silver), both of which are soluble in nitric

acid. The composition of the bichromate of potash is represented by the formula, KO, 2 Cr O_3.

Therapeutics. Never employed as a medicine.

Off. Prep. The bichromate is used for making a volumetric solution for the estimation of the protosalts of iron. An explanation of its action when thus employed will be found among the volumetric solutions.

Potassii Iodidum. Iodide of Potassium.

Prep. The mode of preparing this salt consists in adding iodine to a solution of potash, when the following changes ensue (6 KO + I_6 = 5 KI + KO, IO_5). The mixture of the two salts, namely, the iodide of potassium and iodate of potash, with a little charcoal in fine powder, is heated to redness, by which means the iodate of potash is converted into iodide of potassium, the charcoal facilitating the deoxidation.

Another method, formerly employed, is to form an iodide of iron, by bringing together iodine and iron with water, at a moderate heat; then adding carbonate of potash to the solution, when carbonate of iron and iodide of potassium are formed; the former salt being separated by filtration, the solution by evaporation yields the latter in a crystallized state.

Prop. & Comp. Iodide of potassium forms white semi-transparent cubic crystals; without odour if pure, and of a saline taste; as met with in commerce, it occasionally has some odour of free iodine; very soluble in water, and in about six or eight parts of rectified spirit; the solutions should be neutral; and the watery solution, mixed with mucilage of starch, gives a blue colour on the addition of a minute quantity of chlorine. Iodide of potassium gives a crystalline precipitate with tartaric acid; but tartaric acid and starch should not develope a blue colour; should they do so, it indicates the presence of iodate of potash; for iodic acid, being then liberated by the tartaric acid, acts as an oxidizing agent upon the hydriodic acid which is formed at the same time, and sets free the iodine. Iodide of potassium, when treated with acetate of lead, gives a yellow precipitate of iodide of lead, soluble in boiling water; but it does not alter lime-water, or chloride of barium; with nitrate of silver a pale yellow iodide falls, insoluble in solution of ammonia, and the ammoniacal liquid gives with ex-

cess of nitric acid no turbidity, showing a freedom from chlorides. Composition (KI).

Off. Prep. Unguentum Potassii Iodidi. Iodide of Potassium Ointment. (Iodide of potassium, sixty-four grains; boiling distilled water, one fluid drachm; prepared lard, one ounce. Dissolve the iodide in the water, then mix with the lard.)

Iodide of potassium is contained also in linimentum iodi, tinctura iodi, and unguentum iodi compositum; but in all these preparations it is introduced more on account of its solvent than its therapeutic powers.

Therapeutics. The action and uses of this drug have been described under *Iodine;* it does not possess the local irritant properties of free iodine, and hence is more adapted for internal administration. The ointment may be used when the slow action of the iodide upon a diseased part is desired.

Dose. 1 gr. to 10 gr., or more.

Adulteration. The salt may be damp, from the presence of water; it may also contain many impurities, as carbonate of potash, chlorides of sodium and potassium, iodate of potash, free iodine, &c., all detectable by the tests above given. When iodate of potash exists in the salt, from the imperfect ignition of the mixed iodide and iodate, the ointment is apt to become yellow, owing to the decomposition of the iodic acid by the animal matter.

Potassii Bromidum. Bromide of Potassium.

Prep. The same as iodide of potassium, substituting an equivalent quantity of bromine for iodine. It can also be formed by the second or iron process.

Prop. & Comp. This salt forms white transparent cubic crystals, closely resembling the iodide, with no odour, but a pungent saline taste, readily soluble in water, less soluble in spirit. Its watery solution gives a white crystalline precipitate with tartaric acid. When its solution is mixed with a little chlorine, ether agitated with it, on rising to the surface exhibits a red colour. A solution of the salt mixed with mucilage of starch and a drop of an aqueous solution of bromine, does not exhibit any blue colour, indicating the absence of iodine. Composition (K Br). Ten grains require for complete decomposition 84 measures of the

volumetric solution of nitrate of silver, equivalent to 6·72 grains of bromine.

Therapeutics. Bromide of potassium, when pure, does not give rise to the symptoms of coryza produced by the iodide. It acts as a powerful alterative, and may be used with advantage in certain forms of chronic disease, as syphilitic skin affections, &c. In large doses, sleepiness, drowsiness, and dull headache are sometimes produced, and in still larger doses it causes some loss of power over the lower extremities, and exerts a most powerful influence on the generative organs, lowering their functions in a remarkable degree; it is found to be a most valuable remedy in diseases dependent on and accompanied by excitement or over-action of these organs, and may be given with advantage in nymphomania, priapism, and certain forms of menorrhagia; as likewise in nervous convulsive diseases dependent on uterine irritation, and in some ovarian tumours. It appears also to produce an anæsthetic condition of the larynx and pharynx, and hence has been usefully employed in examinations and operations on these parts.

Dose. 5 gr. to 15 gr. and upwards.

Adulteration. A few years since bromide of potassium was apt to contain iodide of potassium, sometimes in large amounts; this can be detected by the starch test above given. It may likewise contain bromate of potash ($KO, Br O_5$).

Potassa Sulphurata. Sulphurated Potash; [Potassii Sulphuretum. U. S.] Hepar Sulphuris.

Synonym. Potassii Sulphuretum. *Lond.*

Prep. By mixing together sulphur and carbonate of potash, and afterwards heating in a crucible till they have combined.

Prop. & Comp. A brown liver-coloured mass, which is brittle, slightly deliquescent, having a strong odour of sulphuretted hydrogen, especially when moist, and an acrid disagreeable taste; soluble in water, forming a yellow solution; the solution is precipitated by acids, with the deposition of sulphur, and strikes black with the salts of lead. The acid fluid when boiled and filtered is precipitated yellow by bichloride of platinum, and white by chloride of barium. It consists chiefly of tersulphuret of potassium (KS_3), with some sulphate of potash; about three-fourths of

its weight (sulphuret of potassium) should be dissolved by rectified spirit.

Therapeutics. In small doses it acts as a stimulant diaphoretic and expectorant, and is sometimes employed in the treatment of chronic skin diseases, as scabies and psoriasis; also in chronic rheumatism, and certain cases of bronchitis. Externally in the form of ointment, bath, or lotion, in the above-named affections. It is poisonous in very large doses.

Dose. 3 gr. to 6 gr., in pill; in ointment, about 60 gr. to 1 oz. of lard.

Adulteration. When exposed, this compound becomes pale from oxidation and the formation of sulphate of potash.

Potassii Ferrocyanidum. Appendix A. Ferrocyanide of Potassium; Yellow Prussiate of Potash.

Prep. This salt is always formed when carbonate of potash and animal matters, as hoofs, horns, &c., are heated to redness along with iron, as in an iron pot, or with iron nails; from the incinerated mass, when cool, the salt can be dissolved out, and crystallized from the filtered solution.

Prop. & Comp. Ferrocyanide of potassium forms large yellow transparent, rhombic octahedrons, with truncated apices, having a saline and sweetish bitter taste; soluble in water; the solution is not altered either by alkalies or tincture of galls; it gives a precipitate with sulphate of iron, which is at first white, but soon changes to blue; with sulphate of copper a chocolate brown or maroon red, and with sulphate of zinc a white precipitate. By heat ferrocyanide of potassium first loses 12·6 per cent. of water, and becomes white; and is afterwards decomposed, leaving an ash soluble in hydrochloric acid, and precipitated by ammonia. This precipitate, consisting of sesquioxide of iron, amounts to 18·7 per cent. of the salt. When heated with dilute sulphuric acid, an odour of hydrocyanic acid is evolved. Composition (2 K Cy+Fe Cy+3 HO), or a double cyanide of potassium and iron. In the Pharmacopœia its formula is thus represented, K_2 Fe Cy_3+3 HO. Cyanogen (Cy)=C_2 N.

Use. It is employed in the preparation of hydrocyanic acid, and not used medicinally; although represented above as a double cyanide, the grouping of the elements is probably not in that form;

for the salt is by no means poisonous even in large doses; there are also chemical, as well as therapeutic, reasons in favour of its containing a peculiar radical. A watery solution of the ferrocyanide of potassium is used for testing.

Ferridcyanide of Potassium. Red Prussiate of Potash. Appendix B.

Prop. & Comp. $K_3 Fe_2 Cy_6$. In prismatic crystals of a fine red colour; soluble in water. The solution gives no precipitate with the persulphate of iron, but a dark blue with the protosalts of this metal. Introduced as a test into the Pharmacopœia to distinguish between the proto- and per-salts of iron.

[Potassii Cyanidum. Cyanide of Potassium. U. S. Made by heating together Ferrocyanide of Potassium and Carbonate of Potassa. The newly formed cyanide, while melted, is poured carefully off the precipitated oxide of iron. It occurs in white opaque, amorphous masses, having the smell and taste of hydrocyanic acid. Its medicinal properties are identical with those of hydrocyanic acid, and it has the advantage of being a much more stable compound. Dose, $\frac{1}{8}$ of a grain, which may be gradually and carefully increased to $\frac{1}{2}$ a grain.]

Sapo Mollis. Soft Soap. [Not officinal in U. S. P.] A compound containing potash. It is described under Olive Oil.

SODIUM.

(Na. Eq.=23.)

This metal, called also Natrium, is contained in the soda salts, but does not exist native; when pure, it resembles silver in colour, but is soft; sp. gr. 0·97; rapidly oxidizes, and forms a protoxide, the alkali soda.

Liquor Sodæ. Solution of Soda.

Prep. Carbonate of soda, one pound; slaked lime, twelve ounces; distilled water, a gallon. Prepared in the same manner as directed for the solution of potash. The changes which take place in this process are exactly the same as those which occur in forming liquor potassæ.

Prop. & Comp. Liquor sodæ is a colourless liquid, with intensely caustic taste; sp. gr. 1·047. [1.071. U. S.] One fluid ounce requires

for neutralization 47 measures of the volumetric solution of oxalic acid, equivalent to 14·57 grains of alkali. In most of its characters it resembles liquor potassæ, except that it is not precipitated by bichloride of platinum, or tartaric acid, and is precipitated by a solution of antimoniate of potash, the antimoniate of soda being a very insoluble salt. When heated with an excess of dilute nitric acid and evaporated to dryness, the residue forms with water a clear solution, which is rendered turbid by chloride of barium and by nitrate of silver, but not by ammonia, indicating traces of sulphates and chlorides, and the absence of metallic impurities (iron, &c.).

Therapeutics & Use. The action upon the system would probably be almost the same as that of liquor of potassæ. It is employed in the preparation of sulphurated antimony, and in other processes.

Dose. 10 min. to 1 fl. drm., freely diluted.

Soda Caustica. Caustic Soda; Hydrate of Soda. [Not officinal in U. S. P.]

Prep. Made by evaporating solution of soda to an oily consistence, and pouring it on a clean silver or iron plate to solidify.

Prop. & Comp. It occurs in white fragments or cakes, alkaline and corrosive. Soluble in water; its solution in water acidulated by nitric acid gives scanty white precipitates with nitrate of silver and chloride of barium. Forty grains dissolved in water leave scarcely any sediment, and require for neutralization about ninety measures of the volumetric solution of oxalic acid, corresponding to 27·9 grains of soda. Composition (Na O, HO).

Off. Prep. Liquor Sodæ, above described, contains caustic soda, and in the British Pharmacopœia is considered an officinal preparation of that substance.

Therapeutics. Soda may be employed externally as a caustic, in the same manner as potash. It is less deliquescent, and therefore more convenient, but likewise probably somewhat less powerful. It may be cast into sticks for medicinal use.

Sodæ Carbonas. Carbonate of Soda.

Prep. Formerly derived from kelp or barilla, the ashes obtained from burning sea-weeds, and species of salsola; it is now almost always made from common salt, by converting the chloride of sodium into a sulphate by means of sulphuric acid, and afterwards, by combustion with small coal and chalk, resolving this salt into a sulphuret, and then into a carbonate; it is manufactured on a very large scale.

Prop. & Comp. Carbonate of soda forms large rhombic octahedrons, colourless, transparent except on the surface, with an alkaline and caustic taste; it effloresces and crumbles when exposed to air; it imparts a yellow colour to flame; very soluble in water; dissolves with effervescence in hydrochloric acid, forming a solution which does not precipitate with chloride of platinum. By heat it undergoes aqueous fusion, and loses 63 per cent. of its weight. When supersaturated with nitric acid it precipitates slightly, or not at all, with chloride of barium or nitrate of silver. One hundred and forty-three grains require for neutralization at least 96 measures of the standard solution of oxalic acid. Composition (Na O, CO_2+10 HO).

Off. Prep. Sodæ Carbonas Exsiccata. Dried Carbonate of Soda. (Carbonate of soda, eight ounces. Apply heat to the carbonate, until the crystals fall to powder, and afterwards heat it to redness; lastly, rub it to powder.) It is simply the last salt deprived of its water of crystallization, which amounts to 62·93 per cent. by heat; it is soluble in water, and contains 41·51 per cent. of carbonic acid, and 58·49 of soda. Composition (Na O, CO_2).

Therapeutics. The action of carbonate of soda resembles that of the corresponding salt of potash, but is perhaps less caustic. The general effects of soda salts will be described under Soda Bicarbonas.

Dose. 10 gr. to 30 gr. Of sodæ carbonas exsiccata, 5 gr. to 15 gr.: this last is convenient when it is desired to administer the drug in powder or pill.

Adulteration. It usually contains a little sulphate of soda, detected by the baryta test above given.

Sodæ Bicarbonas. Bicarbonate of Soda.

Prep. From the carbonate, in the same way as the bicarbonate of potash is prepared.

Prop. & Comp. It forms an opaque white powder, or minute crystals, slightly alkaline, and not caustic; soluble in water; it dissolves with much effervescence in dilute hydrochloric acid, forming a solution which does not precipitate with bichloride of platinum, nor with sulphate of magnesia, unless heated (this last negative test distinguishes it from the proto-carbonate): when supersaturated with nitric acid, its solution scarcely precipitates with chloride of barium or nitrate of silver. It loses a portion of its carbonic acid at 212°. Eighty-four grains exposed to a red heat leave 53 of an alkaline residue (carbonate of soda), which requires for neutralization 100 measures of the volumetric solution of oxalic acid. It gives a precipitate with antimoniate of potash. Composition ($Na\ O,\ CO_2 + HO,\ CO_2$).

Therapeutics. Very similar to bicarbonate of potash, and almost all that has been stated of the action of that salt applies to this, except that the urate of soda is very much less soluble than the potash salt, and hence soda is less adapted for the treatment of the uric acid diathesis. Other differences probably exist, but are not well made out. Some practitioners are of opinion that the bicarbonate of soda agrees better with the stomach than the potash salt.

Dose. 10 gr. to 60 gr.

Adulteration. Carbonate and sulphate of soda in an efflorescent state, detected by the magnesia and baryta tests.

Sodæ Arsenias. See Arsenical Preparations.

Sodæ Sulphas. (Not officinal.) [Officinal in U. S. P.] Sulphate of Soda; Glauber's Salts.

Prep. By treating common salt with sulphuric acid in the process for making hydrochloric acid; it is found native, and exists in sea-water.

Prop. & Comp. It forms six-sided oblique rhombic prisms, which are deeply channelled; colourless, transparent, neutral, with a bitter saline taste; effloresces in air, soluble in water; in a dilute solution scarcely any precipitate is produced with nitrate of silver, showing only a trace of chloride to be present; it con-

tains 55·5 per cent. of water, and yields with chloride of barium 71 per cent. of sulphate of baryta. Composition (Na O, SO_3 + 10 HO).

Therapeutics. It acts as a saline purgative, and in small doses as a diuretic; was formerly much employed, but at present sulphate of magnesia is generally substituted for it on account of its more agreeable taste. The so-called Cheltenham Salts consist chiefly of sulphate of soda.

Dose. ½ oz. to 1 oz. When effloresced, the dose is smaller.

Acetate of Soda. Appendix A.

Prop. & Comp. Acetate of soda is a crystalline salt having the formula, Na O, C_4 H_5 O_3 + 6 HO. It is soluble in water, but slightly so in alcohol. The watery solution, when dilute, should not be precipitated by chloride of barium or nitrate of silver, showing the absence of sulphates and chlorides. It is used in the preparation of glacial acetic acid, and also as a test solution for qualitative analysis.

Therapeutics. Acetate of soda is rarely used as medicine; it acts as a mild diuretic, less powerful than acetate of potash.

Dose. 20 gr. to 60 gr.

Sodæ Sulphis. Sulphite of Soda. (Not officinal.) [Officinal. U. S. P.]

Prep. By neutralizing the bisulphite of soda with carbonate of soda, and crystallizing. The bisulphite is formed by saturating a solution of carbonate of soda with sulphurous acid gas.

Prop. & Comp. White prisms, having a slight odour of sulphurous acid; soluble in water. Composition (Na O, SO_2 + 8 HO).

Therapeutics. The same as sulphurous acid, and adapted for internal administration in cases of chronic vomiting connected with the presence of sarcinæ ventriculi in the stomach. It may also be applied in the form of lotion (see Acidum sulphurosum).

Dose. 20 gr. to 60 gr.

Hyposulphite of Soda. Appendix B. [Not officinal in U. S. P.]

It occurs in large rhombic prisms with oblique faces, which are very soluble in water. The hyposulphite of soda, in common with other soluble hyposulphites has the peculiar property of dissolving

chloride of silver, and also of rendering colourless a solution of iodine; the explanation of this latter phenomenon will be found among the volumetric tests. Its composition is represented by the formula, Na O, S_2 O_2+5 HO.

Use. It is introduced into the Appendix of the Pharmacopœia for the formation of one of the volumetric solutions.

Therapeutics. The same as the Sulphite; when decomposed sulphurous acid is set free along with sulphur.

Dose. 20 gr. to 60 gr.

Nitrate of Soda. Appendix A. [Not officinal in U. S. P.]

Prop. & Comp. A deliquescent salt crystallizing in obtuse rhombohedra; it is soluble in water; the solution should give no precipitate with nitrate of silver or chloride of barium, showing the absence of chlorides and sulphates. Composition (Na O, NO_5).

Therapeutics. It is not employed in medicine, but is introduced for making the nitrite of soda.

Nitrite of Soda. Appendix A. [Not officinal in U. S. P.]

Prep. By heating in a clay crucible, to dull redness, one pound of nitrate of soda, with an ounce and a quarter of recently burned charcoal in fine powder. In this process the nitrate is partially deoxidized by means of the charcoal.

Prop. & Comp. The nitrate is a fusible salt, occurring in white fragments, opaque, soluble in water and rectified spirit. The watery solution gives a precipitate with nitrate of silver (nitrite of silver), which dissolves when the solution is heated. When a fragment is moistened with a solution of sulphate of copper it acquires a fine emerald green colour from the formation of the green nitrite of copper. Tartaric acid, added to a strong solution, developes ruddy fumes, by setting free the nitrous acid, but gives no precipitate, showing that no potash is present. Composition (Na O, NO_3).

Use. It is used in the formation of Spiritus Ætheris Nitrosi.

Sodæ Phosphas. Phosphate of Soda; Tasteless Purging Salts.

Prep. Formed by digesting bone ash (phosphate of lime) in sulphuric acid, neutralizing the liberated phosphoric acid with carbonate of soda, filtering, and crystallizing.

Prop. & Comp. Phosphate of soda forms large, transparent, oblique, rhombic prisms, with a mild saline taste, effloresceing in the air. It imparts a yellow colour to flame, is alkaline in reaction, very soluble in water, and is precipitated white by chloride of barium, the precipitate (phosphate of baryta) being soluble without effervescence in dilute nitric acid; with nitrate of silver it throws down the yellow phosphate, also soluble in nitric acid; it loses 63 per cent. of water at a dull red heat, and the remaining salt dissolved in water gives with chloride of barium a precipitate entirely soluble in dilute nitric acid, and with nitrate of silver a precipitate of a white colour, owing to the change of the tribasic acid into pyrophosphoric acid, by the action of heat. Composition ($2\ Na\ O, HO, PO_5 + 24\ HO$).

Therapeutics. In large doses it acts as a mild saline purgative; in smaller ones as a diuretic, altering also the condition of the urine, rendering it alkaline, and increasing its solvent power for uric acid; sometimes employed as a pleasant purgative for children and delicate persons, and frequently in the uric acid diathesis.

Dose. As a purgative, ½ oz. to 1 oz.; as a diuretic, 30 gr. to 120 gr.—given in mutton broth it is almost tasteless.

Adulteration. It frequently contains a little phosphate of lime, which renders the solution milky.

Borax. Borax, Biborate of Soda. [Sodæ Boras. U. S.]

Synonym. Sodæ Biboras. *Dub.*

Prep. Found native in Thibet, and imported from India as tincal or crude borax; made also in Tuscany by neutralizing the boracic acid, obtained from the lagoons with carbonate of soda.

Prop. and Comp. Flattened six-sided prisms, semitransparent, with a slight alkaline reaction and saline taste, efflorescent; insoluble in rectified spirit; pretty soluble in water, especially when hot; and from this solution, on the addition of any of the mineral acids, crystalline scales of boracic acid are thrown down; the solution of boracic acid in spirit burns with a green flame; it loses its water and fuses when heated. Composition ($Na\ O, 2\ B\ O_3 + 10\ HO$): 191 grains dissolved in 10 fluid ounces of distilled water require for saturation 100 measures of the volumetric solution of oxalic acid, equivalent to 31 grains of soda.

Off. Prep. Mel Boracis. Honey of Borax. [Mel Sodæ Boratis. U. S.] (Powdered borax, sixty-four grains; [sixty grains. U. S.] honey, one ounce. Mix.)

Therapeutics. Borax acts as a mild alkali upon the alimentary canal, and after absorption tends to render the fluids alkaline, and to produce diuresis: other powers have been attributed to it, viz., a specific action upon the uterus, causing contraction. It is used sometimes as a diuretic and antacid, sometimes combined with ergot to produce expulsion of the placenta, and as an emmenagogue. Externally it is used mixed with honey, or as a gargle, to aphthous conditions of the tongue and throat, and in mercurial salivation.

Dose. 10 gr. to 60 gr.

Liquor Sodæ Chloratæ. Solution of Chlorinated Soda. [Liquor Sodæ Chlorinata. U. S.]

Prep. Carbonate of soda, twelve ounces; distilled water, forty-five fluid ounces; chloride of sodium, four ounces; binoxide of manganese, three ounces; sulphuric acid, two fluid ounces and a half. Dissolve the carbonate in thirty-six ounces of the water; then put the chloride and binoxide, rubbed to powder, into a retort, and add to them the sulphuric acid, previously mixed with three fluid ounces of water, and cooled. Heat the mixture, and pass the chlorine first through five fluid ounces of water, and afterwards into the solution of carbonate made as above directed. [Chlorinated lime, twelve troy ounces; carbonate of soda, twenty-four troy ounces; water, twelve pints. Rub the chlorinated lime gradually with small portions of water, until a smooth, uniform mixture is obtained. Mix this intimately with water until nine pints have been used. Decant the clear liquor and pass the residue through a muslin strainer, until in all eight pints have been obtained. Mix this thoroughly with the carbonate of soda, dissolved in three pints of water. Transfer the mixture to a muslin strainer and allow it to drain, adding water, if necessary, until eleven pints and a half have passed. Keep in well stopped bottles, protected from the light. U. S.]

Prop. & Comp. A colourless or pale yellow liquid, having the odour of chlorine, a pungent taste, and alkaline reaction, with the power of bleaching vegetable colours, turmeric paper being first made brown, and the colour afterwards speedily destroyed; indigo is also decolorized by it; when lime-water is added, a

precipitate of carbonate of lime is thrown down; it effervesces with hydrochloric acid, evolving chlorine and carbonic acid, and forming a solution which does not precipitate with bichloride of platinum. It contains in solution a peculiar compound of soda and chlorine, by many thought to be bichloride of soda (Na O, Cl O), together with bicarbonate of soda and chloride of sodium; when exposed to the air, from the absorption of the carbonic acid, and more especially when an acid is added to it, free chlorine is evolved. It is not precipitated by oxalate of ammonia. Sp. gr. 1·03. [1·045. U. S.] One fluid drachm, added to a solution of 20 grains of iodide of potassium in 4 fluid ounces of water, and acidulated with 2 fluid drachms of hydrochloric acid, requires for the discharge of the brown colour which the mixture assumes (from the liberation of iodine) 43 measures of the volumetric solution of hyposulphite of soda, equivalent to 1·52 grains of chlorine.

Off. Prep. CATAPLASMA SODÆ CHLORATÆ. Poultice of Chlorinated Soda. (Boiling water, eight fluid ounces; powdered linseed, four ounces; solution of chlorinated soda, two fluid ounces. Stir constantly, add the linseed to the water by degrees, then mix in the chlorinated soda.)

Therapeutics. Internally it acts as an antiseptic and stimulant, and has been given with success in low malignant fevers, as scarlatina, &c. Externally, in the form of cataplasm or solution, it is applied to correct the fœtor of unhealthy or gangrenous parts, and also to stimulate to more healthy action. As a gargle it is useful in ulcerated sore throats, and in ulcerated mouths from the use of mercury.

Dose. 10 min. to 20 min., or more, diluted with 1 fl. oz. of water; or as a gargle, ½ fl. oz. to 1 fl. oz. in the ½ pint of water.

The test of its goodness is the free evolution of chlorine when an acid is added to it.

Sodii Chloridum. Chloride of Sodium; Common Salt.

Found in Cheshire as rock-salt, and in brine springs; also in sea-water, &c.

Prop. & Comp. Transparent cubes, soluble in water and spirit, but not in absolute alcohol, imparting a yellow colour to flame. The solution is not precipitated by bichloride of platinum, but gives a white precipitate with nitrate of silver, soluble in

ammonia, but insoluble in nitric acid. Composition (Na Cl). It should be free from moisture; the solution is not rendered hazy by chloride of barium, nor by phosphate of soda after the addition of a mixed solution of ammonia and hydrochlorate of ammonia, showing the absence of sulphates, and of magnesia.

Therapeutics. A necessary article of food, contained in blood and other animal fluids. A deficiency of it causes disease, the production of worms, &c. In large doses it is emetic and purgative; in milder ones, it acts as a slight stimulant and alterative. Externally applied, it is also stimulant and rubefacient. Sometimes used in the form of sea-water as an emetic, purgative, and anthelmintic; also as an adjunct to clysters: its internal employment, however, is chiefly as a condiment. Sponging and bathing in salt-water, aided or not with friction, are valuable in many affections, as chronic rheumatism, joint affections, &c.

Dose. A tablespoonful or more as an emetic.

Sodæ et Potassæ Tartras. Tartrate of Soda and Potash; Rochelle Salt.

Prep. Made by saturating bitartrate of potash with carbonate of soda, when the basic equivalent of water is replaced by one of soda, and carbonic acid given off.

Prop. & Comp. Four or six-sided prisms, generally occurring in half crystals, neutral in reaction, entirely soluble in cold water, tasting like common salt. When sulphuric acid is added to a strong solution, bitartrate of potash is precipitated. Nitrate of silver and chloride of barium throw down no precipitate, or only such as is dissolved by water. Heated with sulphuric acid it blackens and evolves inflammable gas. It imparts a yellow colour to flame. Composition ($Na\ O, KO, C_8\ H_4\ O_{10} + 8\ HO$). Forty-seven grains heated to redness till gases cease to be evolved, leave an alkaline residue, which requires for neutralization 30 measures of the volumetric solution of oxalic acid.

Therapeutics. A mild saline purgative, in large doses; in smaller ones, diuretic; and producing an alkaline condition of the fluids in the same way as tartrate of potash: it is employed under exactly similar circumstances.

Dose. As a purgative, 120 gr. to ½ oz.; as a diuretic, 30 gr. to 60 gr.

Soap and Valerianate of Soda will be treated of under the heads of Olive Oil and Valerian.

STANNUM. TIN.

(Sn. Eq.=59.)

Granulated Tin. Appendix B.

Grain Tin, prepared by fusing and pouring it into cold water, is now introduced for the preparation of chloride of tin.

Therapeutics. This metal is not, at the present time, often used as a medicine, but was formerly employed in the form of powder, *pulvis stanni*, as an anthelmintic, given in about half-ounce doses, mixed with honey, treacle, or some confection: it is supposed by some to act simply as a mechanical agent; by others, on account of the hydrogen set free by the action of the gastric juice on the metal.

Solution of Chloride of Tin. Appendix B.

Prep. By dissolving tin in dilute hydrochloric acid by the aid of heat. One ounce of the metal is contained in five fluid ounces of the solution.

Prop., Comp., & Use. The solution containing the protochloride of the metal (Sn Cl) is a powerful deoxidizing agent; it gives with solutions containing gold, a purple colour, and is used in testing.

ZINCUM. ZINC.

(Zn. Eq.=32·5.)

Zinc, and **Granulated Zinc.** Appendix.

Prep. Obtained from the sulphuret, Blende, or the native carbonate, Calamine, by distillation with carbonaceous matters. Granulated zinc is prepared by fusing zinc and pouring it into cold water.

Prop. & Comp. A bluish-white crystalline metal; sp. gr. 6·86; soluble in dilute hydrochloric and sulphuric acids with evolution of hydrogen, also in nitric acid. The gas evolved on the addition of pure sulphuric acid does not blacken a piece of paper moistened with acetate of lead, and when ignited gives no dark stain to the lid of a porcelain crucible held low down in the flame, showing that the metal is free from sulphur and arsenic. The precipitate

thrown down by ammonia is re-dissolved by excess of that reagent. Used in pharmacy for the preparation of the chloride.

Zinci Oxidum. Oxide of Zinc.

Prep. Made by heating the carbonate of zinc in a loosely covered crucible exposed to a dull red heat; the carbonic acid is driven off, and the oxide of zinc remains.

Prop. & Comp. A white powder, without odour or taste, becoming pale yellow by heat, insoluble in water, but soluble in hydrochloric and other acids, and forming white dilute sulphuric acid a solution which gives a white precipitate with hydrosulphuret of ammonia. Oxide of zinc dissolves, without effervescence, in diluted nitric acid; the solution is not affected by chloride of barium or nitrate of silver, and gives a white precipitate with carbonate of ammonia, which dissolves entirely without colour in excess of the reagent; the three latter reactions indicating the absence of sulphates, chlorides, alumina, iron, or other metallic impurities. In composition it is a protoxide (Zn O).

Off. Prep. Unguentum Zinci Oxidi. Ointment of oxide of Zinc. (Oxide of zinc, eighty grains; simple ointment, one ounce. Mix them together.)

Therapeutics. A tonic, especially to the nervous system; also somewhat astringent: locally applied, a slight astringent and desicant. Used chiefly in chorea, hysteria, and epilepsy; and externally, to excoriated surfaces and slight ulcerations.

Dose. 1 gr. to 10 gr., or more in pill or powder.

Adulteration. Chalk, carbonate of magnesia; detected by effervescing, and the special tests of these bodies. Starch has sometimes been used to adulterate this oxide.

Calamina Præparata. Prepared Calamine. (Not officinal.) An oxide of zinc, prepared from calamine, the native carbonate of zinc, by heat and elutriation.

Prop. & Comp. A greyish powder, almost entirely soluble in dilute sulphuric acid, with scarcely any effervescence; and the precipitate thrown down by ammonia or potash is redissolved by excess of these reagents.

Ceratum Calaminæ. Cerate of Calamine; Turner's Cerate, contained in London Pharmacopœia, 1851. (Prepared calamine,

wax, of each, seven ounces and a half; olive oil, one pint. Mix the oil with the melted wax, then remove them from the fire, and when they first begin to thicken add the calamine, and stir constantly until they cool.)

Therapeutics. Only used externally as a desiccant; it possesses no advantages over the pure oxide of zinc.

Adulteration. As found in shops, it often contains little or none of the oxide of zinc; but consists of sulphate of baryta, coloured, an impurity detected by its weight and insolubility.

Zinci Chloridum. Chloride of Zinc.

Prep. Made by dissolving granulated zinc in hydrochloric acid, digesting for some hours with heat, filtering, and adding solution of chlorine, until the fluid acquires a permanent odour of that gas; afterwards adding carbonate of zinc in small quantities at a time, until a brown sediment appears; this is separated, and the fluid evaporated to a proper consistence and poured into moulds to solidify.

The use of the chlorine, and carbonate of zinc is to peroxidize and precipitate any iron.

Prop. & Comp. A white, crystalline, semi-transparent mass, in rods or tablets, rapidly absorbing water if exposed to the air, and deliquescing; soluble in rectified spirit, in water and in ether. The watery solution is precipitated white by hydrosulphuret of ammonia and nitrate of silver, but if first acidulated with hydrochloric acid, it is not affected by sulphuretted hydrogen. The aqueous solution is likewise precipitated by ammonia and potash but the precipitate is redissolved by excess of these reagents; also precipitated by carbonate of soda, or potash, but not redissolved by excess of these reagents. Composition (Zn Cl). The following are the tests for the purity of this salt: its watery solution is not affected by chloride of barium or oxalate of ammonia and is not tinged blue by the ferrocyanide or the ferridcyanide of potassium, showing the absence of sulphates, lime, and iron. The white precipitate thrown down by ammonia is entirely soluble in excess of that reagent.

Therapeutics. When applied externally in substance, or made into a paste with flour or gypsum, it acts as a powerful escharotic;

in solution, as a stimulant and astringent; internally in small doses, as a nervine tonic. A solution of chloride of zinc, sp. gr. 2·0, is used as a deodorizer and disinfectant, under the name of Sir W. Burnett's Solution.

Dose. Internally, ½ gr. to 1 gr. or 2 gr.

Zinci Sulphas. Sulphate of Zinc; White Vitriol.

Prep. By dissolving zinc in dilute sulphuric acid, filtering and mixing with a solution of chlorine, and subsequently adding carbonate of zinc, as directed in the preparation of the chloride; evaporating, and crystallizing.

Prop. & Comp. Sulphate of zinc is in large or small crystals, of the same form as sulphate of magnesia; slightly efflorescent; soluble in water; precipitated and again re-dissolved by ammonia; precipitated by chloride of barium and hydrosulphuret of ammonia. Composition ($Zn\ O, SO_3 + 7\ HO$). Its watery solution is not tinged purple by tincture of galls, and when acidulated with hydrochloric or sulphuric acid is not precipitated by sulphuretted hydrogen. Boiled a few minutes with a little nitric acid, it yields with ammonia, a white precipitate, entirely soluble without colour in excess of the reagent, showing the absence of iron, &c.

Therapeutics. In small doses it acts as an astringent, and nervine tonic; in large doses as a quick, direct emetic; externally, as a powerful astringent. It is used as a tonic chiefly in diseases of the nervous system, as in chorea, epilepsy, hysteria, and allied spasmodic affections; and when gradually increased, tolerance soon becomes established: sometimes it is given as an astringent in chronic passive discharges, as in leucorrhœa, gleet, and bronchorrhœa. In large doses, as an emetic, it is used when the rapid emptying of the stomach is desired without the production of much depression, as in narcotic poisoning, phthisis, and dyspepsia. Externally, in solutions of different strengths, it is employed as a lotion or injection, as in ophthalmia, gleet, &c.

Dose. As a tonic, or astringent, 1 gr. to 10 gr., or more, in pills, or solution; as an emetic, 10 gr. to 30 gr. Externally, from 1 gr. to 30 gr. may be dissolved in an ounce of water.

Zinci Carbonas. Carbonate of Zinc.

Prep. By precipitating a solution of sulphate of zinc with carbonate of soda, washing and drying the precipitate.

Prop. & Comp. A white powder, without odour or taste, insoluble in water, soluble with effervescence, and without residue, in dilute sulphuric acid, the solution giving a white precipitate with hydrosulphuret of ammonia. The solution in nitric acid gives no precipitate with chloride of barium or nitrate of silver; and with carbonate of ammonia, a white precipitate entirely soluble without colour in excess of the reagent. Composition ($Zn\,O, CO_2 + HO) + 2$ ($Zn\,O, HO$), a compound of the carbonate and hydrated oxide of zinc.

Therapeutics. Not much employed as a medicinal agent; it may be used in the same cases as the oxide, both internally and externally; its action is probably identical with that of the oxide of zinc.

Dose. 1 gr. to 10 gr., in pill or powder.

Zinci Acetas. Acetate of Zinc.

Prep. By dissolving carbonate of zinc in acetic acid, evaporating and crystallizing.

Prop. & Comp. Acetate of zinc occurs in thin colourless plates, of a pearly lustre, and a sharp unpleasant taste. Soluble in water, giving a white precipitate with sulphuretted hydrogen; evolving acetic acid when decomposed by sulphuric acid. The solution in water, when slightly acidulated with hydrochloric acid, is not precipitated by sulphuretted hydrogen. Boiled for a few minutes with a little nitric acid, it yields with ammonia a white precipitate, entirely soluble, without colour, in excess of the alkali. Composition ($Zn\,O, C_4 H_3 O_3 + 2\,HO$).

Therapeutics. Chiefly employed as an external agent, in lieu of the sulphate of zinc, to which it is preferred by some. Internally it may also be given as a substitute for the sulphate.

Dose. 1 gr. to 5 gr. As a lotion or injection, 1 gr. to 30 gr., to 1 fl. oz. of water.

Valerianate of Zinc is described under the head of Valerian.

ALCOHOLIC AND ETHEREAL PREPARATIONS, AND CHLOROFORM.

Alcohol. Appendix B. Anhydrous, or Absolute Alcohol.

Prep. Ordered to be made by mixing one pint of rectified spirits of wine, with eighteen ounces of freshly-burnt lime, and distilling with a chloride-of-zinc bath; the first ounce and a half should be rejected, and not more than sixteen fluid ounces drawn off by distillation.

Prop. & Comp. A limpid, colourless liquid, of a pungent, spirituous odour; very volatile; sp. gr. 0·795, rapidly absorbing water; it is a very powerful solvent of certain substances, as alkaloids, pure alkalies, volatile oils, iodine, &c.; it does not dissolve common salt, which is soluble in ordinary rectified spirit. Composition ($C_4 H_5 O + HO$), or hydrate of oxide of ethyl. It is not rendered turbid when mixed with water, and does not give rise to a blue colour when in contact with anhydrous sulphate of copper; it is entirely volatilized by heat; these tests indicating freedom from oily matters, or other impurities.

Use. It is never administered as a medicine, but is employed as a solvent, and to test the purity of some chemical substances.

Spiritus Rectificatus. Rectified Spirit.

Prep. Alcohol is a product of the vinous fermentation of sugar, occurring in wine, malt liquors, &c.: these when distilled, afford spirits, such as brandy and rum; and re-distilled, give rectified spirit. It is usually procured from malt.

Prop. & Comp. Rectified spirit is alcohol ($C_4 H_5 O, HO$) with 16 per cent. of water, and resembles alcohol in most of its properties; sp. gr. 0·838. It burns with a blue flame without smoke; odour and taste, alcoholic; it should not be made cloudy by the addition of water, not tinged red with sulphuric acid. It contains about 84 per cent. of absolute alcohol. Four fluid ounces, with 3 measures of the volumetric solution of nitrate of silver, exposed for 24 hours to a bright light, and then decanted from the black powder which has formed, undergo no further change when again exposed to light with more of the test; indicating the presence of but a small amount of matter capable of decom-

posing nitrate of silver. Alcohol when pure undergoes no change under the influence of this salt and a bright light. The three measures of the silver solution contain nearly half a grain of nitrate of silver.

Off. Prep. Spiritus Tenuior. Proof Spirit, or weak Alcohol.

Prep. (By adding to every five pints of rectified spirit, three pints of distilled water, at a temperature of 60° Fah.) It contains 49 per cent. of alcohol. Sp. gr. 0·920.

Use. *Rectified Spirit* is employed in pharmacy in making many tinctures and spirits, when the substances contain a large amount of resin or volatile oil. *Proof spirit* is used when the drugs are not very rich in such principles.

Therapeutics. Externally it is employed in the form of a lotion. [The U. S. P. contains Alcohol. Spirit of the sp. gr. of 0·835. Alcohol Dilutum. Diluted Alcohol. Alcohol mixed with an equal measure of Distilled Water. Sp. gr. 0·941. Alcohol Fortius—Stronger Alcohol. Spirit sp. gr. 0·817.]

Spiritus Vini Gallici. Brandy, or Spirit distilled from French Wine. (Not officinal.) [Officinal in U. S. P.] [Spiritus Frumenti. Whiskey. U. S.]

Prop. & Comp. Brandy contains about 53 per cent. of alcohol, together with some volatile oil and œnanthic ether ; it is almost white when first distilled, but in the cask acquires some colour, and it has often burnt sugar added to it to produce the same effect.

Prep. Mistura Spiritus Vini Gallici, *Ph. Lond.* 1851. Brandy Mixture. (Spirit of French wine, cinnamon water, each, four fluid ounces ; the yolks of two eggs ; sugar, half an ounce ; oil of cinnamon, two minims. Mix.)

Therapeutics. Brandy may be employed, either in the form of the above mixture or simply diluted with water, when it is desirable to administer a powerful diffusible stimulant, or to keep up the action of the circulation in very low conditions of the system, as in prolonged syncope, typhoid or adynamic forms of fever, delirium tremens, and gangrena senilis ; in small quantities it often assists digestion when taken with a meal, and is used with advantage in atonic dyspepsia. Externally it may be used, diluted with water, as a topical stimulant to threatened bed sores, cracked nipples, &c.

Spiritus Pyroxylicus rectificatus. Pyroxylic Spirit. [Not officinal in U. S. P.]

Prep. Obtained as one of the products of the dry distillation of wood, hence called Wood Spirit.

Prop. & Comp. It is defined in the Pharmacopœia to be a hydrated oxide of methyl ($C_2 H_3 O, HO$), with about 10 per cent. of water; sp. gr. 0·841 to 0·846; colourless, with a spirituous and peculiar odour and taste. It should not exhibit an acid reaction, nor become opaque when mixed with water. Wood spirit is never found in commerce free from impurities.

Therapeutics. Supposed to act as a sedative, and has been employed to allay sickness, and check cough and expectoration in bronchitis and phthisis.

Dose. 10 min. upwards.

Caution. Pyroxylic should never be employed in lieu of spirits of wine in making galenical preparations.

Vinum Xericum. Sherry. A Spanish Wine.

Prop. & Comp. The physical properties of sherry are well known; it contains from 15 to 20 per cent. of alcohol, together with colouring matter, œnanthic ether, and other ethereal compounds, which impart to it the peculiar bouquet; also certain salts, as bitartrate of potash, malates, and sugar.

Off. Prep. It is used in making the vina, or wines, of the Pharmacopœia, as Vinum Aloes, Vinum Antimoniale, Vinum Colchici, Vinum Ferri, and Vinum Opii. Cape and other white wines are often substituted for sherry.

Therapeutics. Wine may be given as a medicine in the same cases as brandy, where it is desirable to keep up the action of the circulating system; as a stimulant in dyspepsia, however, it is often inferior to brandy, from its tendency to become acid. The *wines* of the Pharmacopœia are sometimes objectionable when large doses are required, on account of the alcohol they contain: and the same remark applies to the administration of tinctures.

Cerevisiæ Fermentum. Yeast of Beer. [Fermentum. Yeast. U. S.]

Prep. During the fermentation of an infusion of malt, by the

action of yeast, a fresh formation of the ferment (yeast) is produced from the albuminous principles contained in the malt.

. *Prop. & Comp.* Yeast is a yellowish or greyish white, viscid, frothy liquid, having a characteristic odour and a peculiar bitter taste; under the microscope it is found to consist, for the most part, of separate oval confervoid cells or vesicles. The plant is called the *Torula cerevisiæ*. In composition yeast resembles gluten or albumen, but it is in an active condition, and possesses the property of exciting the vinous fermentation in saccharine solutions.

Off. Prep. CATAPLASMA FERMENTI. Yeast Poultice. (Beer yeast, six fluid ounces; flour, fourteen ounces; water heated to 100°, six fluid ounces. Mix the yeast with the water; add the flour, and stir until a cataplasm is made. Place it near the fire until it rises.)

Therapeutics. Yeast, when externally applied, acts as a stimulant and antiseptic, and in the form of cataplasm or poultice is employed to correct the discharges of indolent ulcers. Internally it has been used in low states of the system, to prevent the formation of boils and carbuncles, and as a remedy in diabetes: in the latter disease there has been no proof given of its efficacy.

Dose. From a dessert to a tablespoonful. Fresh yeast should be employed.

Ether. Ether.

Synonym. Æther Sulphuricus. *Edin. Dub.*

Prep. Ether is prepared by the action of sulphuric acid upon alcohol, the proportion of acid employed being much less than that used in the formation of oleum æthereum, which was formerly officinal. In the British Pharmacopœia ten fluid ounces of sulphuric acid are made to act upon fifty fluid ounces of rectified spirit added in successive portions.

The exact nature of the changes which occur during etherification is a subject which will be found discussed at some length in books of chemistry; the following remarks will perhaps suffice to give some idea of the process.

When alcohol and strong sulphuric acid are heated together, a peculiar acid is formed, named *sulphovinic acid*, represented by

the formula $C_4 H_5 O, 2 SO_3 HO$; if this acid is distilled at a temperature of about 300°, a decomposition occurs which may be thus represented :—$C_4 H_5 O, 2 SO_3 HO + HO = C_4 H_5 O + 2 (SO_3 HO)$; one of the products, oxide of ethyl or ether ($C_4 H_5 O$), being volatile, distils over, and sulphuric acid remains; by the addition of more alcohol, sulphovinic acid is again formed, and again decomposed; and by a continuous and slow supply of alcohol, the formation of the ether is rendered continuous.

Ether is purified by allowing it to stand upon chloride of calcium and slaked lime, and re-distilling until it becomes of sp. gr. 0·735.

Prop. & Comp. Ether is a very volatile, colourless liquid, with a peculiar, agreeable, fragrant odour and hot taste; sp. gr. 0·735 [0·750. U. S. Æther Fortius, a sp. gr. not exceeding 0·728. U. S.]; is entirely dissipated in vapour when exposed to the air, and has scarcely, if any, acid reaction; very inflammable, burning with a white flame; it boils below 105°. A little poured upon the hand evaporates rapidly, producing a sensation of cold. It consists of oxide of ethyl ($C_4 H_5 O$), with about 8 per cent. by volume of alcohol and water. Fifty measures agitated with an equal volume of water are reduced to 41 by an absorption of 18 per cent. It evaporates without residue.

Off. Prep. Spiritus Ætheris. Spirits of Ether. [Not official in U. S. P.] (Ether, ten fluid ounces; rectified spirit, twenty fluid ounces. Mix.) Sp. gr. 0·809.

[Spiritus Etheris Compositus. Compound Spirits of Ether. Hoffman's Anodyne. Ether, half a pint; alcohol, a pint; ethereal oil, six fluid drachms.]

Use. Ether is also made use of in the Pharmacopœia for preparing one tincture, Tinctura Lobeliæ Æthereæ, and for making Collodion.

Therapeutics. Taken internally, ether is a powerful diffusible stimulant, more rapid and evanescent in its action than alcohol; it is used to expel flatus from the stomach, and allay pain and cramp in that organ, to diminish spasm in various other affections, as in spasmodic asthma, angina pectoris, and hysteria. When applied externally it produces cold, from the rapid evaporation, and is occasionally made use of as a refrigerant, in the reduction

of hernia; if the vapour is confined, then rubefacient effects are produced. Inhaled in the form of vapour it acts in a manner not unlike chloroform, under which article the effects are described.

Dose. Of ether, 20 min. to 1 fl. drm.; of spirit of ether, ½ fl. drm. to 1½ fl. drm.

Ether. (Pure.) Appendix A.

Prep. Ether is purified by well washing it with water, digesting it for twenty-four hours with recently burned lime and chloride of calcium, and then distilling it from this mixture with a gentle heat.

Prop. & Comp. Pure ether should have a specific gravity not exceeding 0·720. It does not coagulate the albumen of blood, and is a powerful solvent of a limited number of substances, such as fixed and volatile oils, resins, a few alkaloids, gun cotton, iodine, bromine, bichloride of mercury, &c.

Use. Pure ether is used in the preparation of some alkaloids, as aconitia, in the estimation of quinia in cinchona bark, and to test the purity of some medicinal substances.

Adulterations. Ether may contain alcohol, which increases its specific gravity, and causes it to coagulate the serum of the blood; water and sulphurous acid may also be present, adding to its weight, and giving it an acid reaction.

Spiritus Ætheris Nitrosi. Spirits of Nitrous Ether.

Synonym. Spiritus Etheris Nitrici. *Lond. Edin.*

Prep. Rectified spirit, two pints; nitrate of soda, five ounces; sulphuric acid, four fluid ounces. Add the acid by degrees to the spirit, then pour the mixture upon the nitrate of soda, and distil thirty-five fluid ounces, keeping the receiver very cool; the nitrous acid, liberated by the action of the sulphuric acid, unites with the ether produced from the alcohol, and forms a nitrate of ethyl which distils over, accompanied with alcohol and ether; other compounds are also formed in small quantities during the process, which become mixed with the product. The difficulty of procuring a pure nitrite of soda constitutes the chief objection to the adoption of this process; if a pure salt is used, the product contains much nitrite of ethyl.

Prop. & Comp. A colourless liquid, with an agreeable fruity

odour, and slightly acidulous cooling taste; volatile and inflammable; sp. gr. 0·843; [0.837. U. S.] it has usually a slight acid reaction, but should effervesce feebly or not at all when carbonate of soda is added; when agitated with the solution of sulphate of iron, and a few drops of sulphuric acid, it becomes deep olive brown or black (from the liberation of the peroxide of nitrogen). It consists of alcohol, holding in solution nitrite of ethyl ($C_4 H_5 O, NO_3$). It often contains aldehyde, acetic acid, deutoxide of nitrogen, &c., if prepared by the process of the old London Pharmacopœia. By keeping, the acids increase in quantity, giving to the preparation a strong acid reaction. If it is agitated with twice its volume of a saturated solution of chloride of calcium, 1½ per cent. by volume of nitrous ether separates and rises to the surface.

Therapeutics. Nitrous ether is a stimulant, diaphoretic, and diuretic, chiefly used for the latter property in dropsies; occasionally as a diaphoretic in slight febrile affections: it also appears to act as a grateful refrigerant. It is popularly known by the name of Sweet Spirits of Nitre.

Dose. ½ fl. drm. to 2 fl. drms.

Adulteration. Excess of acid, from being too long kept or improperly prepared; it then effervesces with carbonate of soda.

Chloroformum. Chloroform. [The U. S. P. recognizes Chloroformum venale. Commercial chloroform. Sp. gr. 1·450 to 1·490 and Chloroformum Purificatum. Purified Chloroform. Sp. gr. 1·490 to 1·494.]

Prep. Chlorinated lime, ten pounds; rectified spirit, thirty fluid ounces; water, three gallons; chloride of calcium, broken into fragments, two ounces; slaked lime, a sufficiency; sulphuric acid, a sufficiency; distilled water, nine fluid ounces. The rectified spirit and water are distilled with a mixture of slaked and chlorinated lime; the distillate well agitated with water, and the lower stratum, which is crude chloroform, separated, repeatedly washed with successive portions of water, and well shaken with its own volume of sulphuric acid; the layer of chloroform is again separated, mixed with chloride of calcium and slaked lime, and purified by redistillation. Chloroform may be produced by several processes, but the above probably yields it

purer and more advantageously than any other. When chlorine, from chlorinated lime, acts upon alcohol, many complicated and ill-understood decompositions ensue; the principal product, however, seems to be chloroform.

Prop. & Comp. Chloroform is a colourless heavy liquid, with a peculiarly agreeable, fruity, ethereal odour; sp. gr. from 1·48 to 1·496; but slightly soluble in water, sinking readily in that fluid; it mixes with alcohol and ether in all proportions; neutral in reaction; when rubbed on the skin it quickly evaporates, and, if pure, leaves no odour. Chloroform is a powerful solvent of caoutchouc, gutta percha, many resins, fats, and alkaloids, also of iodine and bromine. Composition (C_2 H, Cl_3), or a terchloride of formyl (C_2 H). When exposed to air and light, it is apt to decompose, hydrochloric acid and free chlorine being formed: it is stated that when chloroform is purified with oil of vitriol, it is more liable to undergo this change, and that redistillation with carbonate of baryta gives it stability. Chloroform is not coloured by agitation with sulphuric acid, and evolves no gas when potassium is dropped into it, indicating the absence of oily matters or any oxygen compounds. Chloroform is decomposed by fixed alkalies; by an alcoholic solution of potash it is resolved into formate of potash and chloride of potassium.

Off. Prep. Linimentum Chloroformi. Liniment of Chloroform. (Chloroform, two fluid ounces; liniment of camphor, two fluid ounces.) [Purified chloroform, three troy ounces; olive oil, four troy ounces. U. S.]

Spiritus Chloroformi. Spirit of Chloroform. (Chloroform, one fluid ounce; rectified spirit, nineteen fluid ounces.) Sp. gr. 0·871. [Purified chloroform, one troy ounce; stronger alcohol, six fluid ounces. U. S.]

Therapeutics. When taken internally, chloroform appears to act as a narcotic and antispasmodic, not unlike ether; its sedative effects, however, are more distinctly marked, and it produces in large doses a general diminution of sensorial power, with drowsiness, and without exhilaration or acceleration of the pulse. It has been employed in spasmodic affections, as spasmodic coughs, asthma, cholera, lead colic, and hysteria; it is also stated to act as a valuable sedative in cancer, neuralgia, and other painful affec-

tions, and it is even asserted to be antiperiodic, relieving sometimes when bark and quinine have failed.

Externally, it has been used in medicine to allay pain and irritation in neuralgia, and certain skin affections attended with troublesome itching. For all these purposes, however, its application is very limited; its chief employment being in the form of vapour, for the production of its anæsthetic effects.

When inhaled in small doses, it produces a slight species of inebriation, with some impairment of vision and common sensibility, consciousness remaining. The sensations produced by these small doses are usually of a pleasurable character; carried to this extent, it may be employed in the treatment of spasmodic and neuralgic affections.

If the inhalation be continued longer, the patient passes into a dreamy state, sometimes with considerable mental excitement, but with loss of common sensibility; it may be given to this extent when employed in natural labour: from these effects the patient soon recovers on the cessation of the administration of the vapour.

If the inhalation be carried still further, the patient loses the power of voluntary motion; there is an inclination of the eyes upwards, complete suspension of the mental faculties, with slight contraction of the muscles and rigidity of the limbs. Although at this stage common sensibility appears quite destroyed, yet on the performance of surgical operations there may be indications expressive of pain in the features, and even moaning and inarticulate cries. When this condition has been kept up for some time, and the winking of the eyelids very much diminished, then is the proper period for the performance of surgical operations.

If the effects be carried further, complete relaxation of the voluntary muscles takes place, but the sphincters remain contracted, the respiration goes on, though accompanied with slight stertorous breathing, the glottis continues sensible, but the sensibility of the pharynx appears to be diminished, so that in operations about the mouth blood frequently finds its way into the stomach; the iris is much less sensitive to light, but not contracted. When the relaxation of the muscles has fully taken place, then the reduction of dislocations and hernia may be effected.

If the inhalation is continued beyond this stage, symptoms indicative of danger succeed: the breathing becomes very stertorous

and slow, and may altogether cease, and death may take place, sometimes accompanied with convulsions.

Chloroform has been administered in the form of vapour in the treatment of tetanus, hydrophobia, colic, and painful spasmodic affections, as during the passage of renal calculi, or of gall-stones, &c.; in some of these cases its use has been followed by great relief. The first and second set of symptoms above mentioned may be generally produced by administering from half a fluid drachm, to a fluid drachm, and repeating it in a few minutes if this condition is required to be kept up. When the inhalation is suspended, the patient, in the course of five or six minutes, recovers his consciousness, but without remembering anything which has taken place. For the production of complete insensibility and relaxation more chloroform must be employed, and the effects carefully watched. If the inhalation has proceeded too far, ammonia, dashing cold water in the face, or even artificial respiration, must be had recourse to.

In the administration of chloroform, several precautions should be taken. In the first place, the chloroform should be pure, that is, free from oily matter, hydrochloric acid, and uncombined chlorine; it should not be used at all, or if so, employed with the greatest care, for persons suffering from any cerebral disease, or tendency to such, or any organic cardiac affection. It may be administered in vapour either by means of a folded handkerchief applied over the face and nose, or by means of inhalers which are sold for this purpose; and care should be taken that the patient breathes atmospheric air at the same time with the chloroform vapour. Disagreeable symptoms sometimes occur after the inhalation of chloroform, as nausea, vomiting, headache: probably these may occasionally arise from impurities in the preparation.

Ether, and the vapour of some other hydrocarbons, as Amyline, Benzol, Dutch Liquid, Bisulphuret of Carbon, &c., when inhaled, produce effects not unlike those of chloroform, and before the discovery of this latter agent, pure ether was always made use of; the effects of ether appear to be almost identical in kind with those of chloroform, but the quantity required to produce the same effect is much greater, from one fluid ounce to two fluid ounces.

It is stated by Dr. Snow that greater muscular relaxation is produced by ether than by chloroform.

When chloroform is taken into the stomach, or exhibited in the form of vapour, it is absorbed into the blood, and Dr. Snow has discovered its presence in the blood of animals killed by this agent. Its detection can be effected by causing the vapour from the suspected fluid to pass through a red-hot tube, when the chloroform, if present, is decomposed and free chlorine evolved, which may be made to act upon nitrate of silver, or upon starch-paper impregnated with iodide of potassium.

Dose. Chloroform, when given in a liquid state, may be rubbed up with yolk of egg and mucilage, or syrup: the dose may be from 1 min. to 10 min. It is more frequently administered in the form of Spiritus Chloroformi (chloric ether), of which the dose may be from 10 min. to 30 min. or more. Externally it may be employed in the form of Linimentum Chloroformi, or added to other liniments, or as an ointment, made by rubbing together 1 part of chloroform, with about 7 of lard. The doses for inhalation have been already indicated.

Adulterations. Hydrochloric acid and free chlorine, detected by their acid reaction and bleaching power, and by the water with which the chloroform has been agitated, precipitating nitrate of silver. Sometimes an oily matter, formed during the preparation, may be present, detected by its leaving an odour on evaporation, and being coloured by sulphuric acid.

Fousel Oil. Appendix A. Amylic Alcohol. [Alcohol Amylicum. Fusel Oil. U. S.]

Prop. & Comp. Fousel oil, a product obtained in the distillation of spirit from potatoes, barley, &c. It is much less volatile than ordinary alcohol, and accumulates in the last portions of the liquids submitted to distillation. It boils at 270°, and has a specific gravity of 0·818, and a peculiar unpleasant odour and taste. Fousel oil is the alcohol of the amylic series, the hydrate of the oxide of amyl ($C_{10}\,H_{11}\,O$, HO), and has the same relation to amyl as alcohol and wood spirit have to ethyl and methyl. By the action of oxidizing agents it is converted into *Valerianic Acid*, which corresponds to acetic acid in the ethyl series:—

$$C_{10}\,H_{12}\,O_2 + O_4 = HO,\ C_{10}\,H_9\,O_3 + 2\,HO.$$

It is for the formation of this acid that it is introduced into the Appendix of the Pharmacopœia.

HYDROCARBONS FROM THE DESTRUCTION OF WOOD BY FIRE, OR FOUND NATIVE.

Creosotum. Creosote, or Kreosote. [Creasotum. Creasote. U. S.] A product of the distillation of Wood Tar.

Prep. During the destructive distillation of wood in the preparation of pyroligneous acid, amongst other hydrocarbons creosote is formed; it is also obtained from oil of tar, or pyroxylic oil, and is contained in the smoke from wood.

Prop. & Comp. A colourless transparent liquid, of peculiar strong odour and burning taste; sp. gr. 1·065; [1·046. U. S.] very slightly soluble in water, but soluble in acetic acid, alcohol, and ether; coagulates albuminous fluids, and has considerable preservative powers over both animal and vegetable matter; it should volatilize entirely at 212° Fah., and not leave a transparent stain on bibulous paper. A slip of deal dipped into it, and afterwards into hydrochloric acid, and allowed to dry in the air, acquires a greenish-blue colour. Much doubt exists as to the composition of creosote; much of that found in commerce is carbolic acid. Probably it is a homologue of phenic (carbolic) acid, represented by the formula, $C_{16} H_{10} O_2$.

Off. Prep. Mistura Creosoti. Creosote Mixture. [Not officinal in U. S. P.] (Creosote, sixteen minims; glacial acetic acid, sixteen minims; spirit of juniper, half a fluid drachm; syrup, one fluid ounce; distilled water, fifteen fluid ounces.)

Unguentum Creosoti. Ointment of Creosote. (Creosote, one fluid drachm; lard, one ounce. Rub them together.) [Creosote, half a fluid drachm; lard, a troy ounce, U. S.]

[Aqua Creasoti. Creasote Water. Creasote, a fluid drachm; distilled water, a pint. U. S.]

Therapeutics. Internally, in small doses, it acts as a stimulant to the stomach, and has often been used with success to arrest certain forms of vomiting, not connected with febrile disturbance of the system; it has been also given with temporary advantage in diabetes. Externally it allays toothache depending on caries, and forms a stimulant application to ulcers and chronic skin disorders, as porrigo; it is used also as a topical styptic in hæmor-

rhages: the vapour mixed with that from hot water is useful in checking excessive expectoration in chronic bronchitis, and correcting the fœtor of the sputa in dilatation of the bronchi, and in pulmonary abscess.

Dose. 1 min. to 5 min., in pill, or rubbed up with mucilage, or with a few drops of acetic acid. As an inhalation, 3 min. to 10 min., or more, to the ½ pint of boiling water. Of Mistura Creosoti, ½ fl. oz. to 1½ fl. oz.

Incompatibles. Creosote, when mixed with oxide of silver gives rise to much heat, and even flame, from the oxidizing power of the silver compound: hence these two medicinal agents should not be prescribed together.

Carbolic Acid. (Not officinal.)

Prep. A product of the distillation of coal.

Description. Carbolic acid is generally met with in the form of an oily liquid, sp. gr. 1·065, with the odour and taste of creosote. It may also be obtained in crystals, which form long and colourless needles, melting at about 95°; a minute trace of moisture causes the liquefaction of the crystals.

Prop. & Comp. Carbolic acid is sparingly soluble in water, soluble in ether, alcohol, and strong acetic acid. It forms crystalline salts with potash, but the solution of carbolic acid does not redden litmus paper. The composition is represented by the formula, HO, C_{12} H_5 O, a hydrate of phenyl; it is sometimes called phenic acid.

Therapeutics. Carbolic acid possesses powerful antiseptic properties, and has been much used lately to correct the fœtor of gangrenous and offensive sores; it renders the discharges less noxious, and removes their disagreeable and putrid smell: hence it is particularly useful in cases of necrosis and caries, and other ulcerations attended with offensive discharges. Internally it resembles creosote in its action, and may be given in similar cases.

Dose. As an external application to ulcers, &c., 1 part of the acid to 7 or 8 of water. Internally 1 min., in the form of a pill.

Petroleum. Barbadoes Tar. (Not officinal.)

Description. A black, bituminous liquid, exuding spontane-

ously from the earth, and found upon the surface of some lakes, especially in the islands of Barbadoes and Trinidad; it resembles treacle in appearance, has a dark-red colour when seen by transmitted light through thin layers, and a peculiar bituminous or tar-like odour and taste: it is lighter than water; sp. gr. about 0·88.

Prop. & Comp. It is insoluble in water, but soluble in fixed and volatile oils, also in ether; inflammable, burning with a very smoky flame; very complex in composition, containing many different hydrocarbons, among which are *eupione* and *paraffine;* when exposed to the air, it hardens into a species of asphaltum.

Therapeutics. Very closely resembles tar and pitch in its action, being a stimulant, diaphoretic, and expectorant: by some thought to be anthelmintic: it has been employed chiefly in chronic squamous skin affections, rheumatism and bronchitis. It may be employed internally or externally.

Dose. ½ fl. drm. to 1 fl. drm., or more.

ORGANIC SUBSTANCES.

VEGETABLE KINGDOM.

VEGETABLES should be gathered in dry weather, and not when wet with rain or dew. They should be collected annually, and not be kept beyond a year.

Most roots and rhizomes should be dug up after the old leaves and stalks have fallen, and before the new ones appear.

Barks ought to be collected at the season in which they can be most easily separated from the wood; herbs and leaves should be gathered after the flowers have blown and before the seeds ripen.

Flowers should be gathered recently blown.

Fruits and seeds should be collected when ripe.

The different parts of vegetables should be kept dried for use, except when otherwise directed. Expose those which are to be

dried, a short time after they have been gathered, in shallow wicker baskets to a gentle heat in a current of air, in the dark; when the moisture is driven off, gradually increase the heat to 150° Fah., that they may dry. Finally, preserve the more delicate parts, viz., flowers and leaves in black glass bottles, well closed, and the rest in vessels, preventing the access of light and moisture.

CLASS I. EXOGENÆ.

Sub-Class I. Thalamifloræ.

RANUNCULACEÆ.

Aconitum. Aconite. The fresh leaves and flowering tops of Aconitum napellus, Monkshood; Lin. Syst., Polyandria trigynia. Gathered when about one-third of the flowers are expanded, from plants cultivated in Britain. [Aconiti Folium. Aconite Leaf. The leaves of Aconitum napellus. U. S.]

Aconiti Radix. Aconite Root. The root, dried, of Aconitum napellus, imported from Germany or cultivated in Britain; and collected in winter or early spring, before the leaves have appeared.

Aconitia. Aconitia. Aconitina. An alkaloid obtained from Aconite Root.

Description. The *leaves* are deep green on the upper surface, lighter beneath, smooth, five-partite, the segments wedge-shaped and pinnately cut. The *root* is fusiform, like a carrot, from one to three inches long, not thicker than the finger at the crown, with fleshy fibres, dark brown on the surface, whitish within. The *flowers* are purple, helmet-shaped, and in racemes.

Prep. & Comp. All parts of the plant are bitter and acrid, causing tingling of the lips and skin, followed by numbness; they contain the alkaloid, *Aconitia* ($C_{60}\,H_{47}\,NO_{14}$) united with *Aconitic acid* ($C_4\,HO_3$); another base is also present, which has been named *Aconella*, resembling narcotine in its composition and properties, capable of crystallization, but not possessing the active properties of Aconitia. Aconitia is a white uncrystallizable solid, soluble in 150 parts of cold, and 50 parts of hot water, and much more soluble in alcohol and ether; alkaline, neutralizing acids,

and precipitated from them by the caustic alkalies, but not by carbonate of ammonia, or the bicarbonates of potash or soda. It melts with heat, and burns with a smoky flame; causes tingling, followed by numbness when rubbed on the skin. It is a very active poison; entirely soluble in pure ether, and leaves no residue when burned with free access of air.

Off. Prep.—Of Aconite (leaves). Extractum Aconiti. Extract of Aconite. (Aconite leaves, fresh, are bruised, and the juice treated as directed for the green extracts.) See Introduction. [Tinctura Aconiti Folii. Tincture of Aconite Leaf. Two pints of tincture are obtained, by percolation, from four troy ounces of powdered leaves. U. S.]

Of the Root:—

Tinctura Aconiti. Tincture of Aconite. (Aconite root, in fine powder, two ounces and a half; rectified spirit, twenty fluid ounces. Prepared by maceration and percolation.) [Aconite Root, in fine powder, twelve troy ounces; two pints of tincture are obtained by percolation. U. S.]

This tincture has one fourth of the strength of Tinctura Aconiti, *Dub.*, and one-third of the strength of Tinctura Aconiti, *Lond.*

Linimentum Aconiti. Liniment of Aconite. [Not officinal in U. S. P.] (Aconite root, in powder, twenty ounces; camphor, one ounce; rectified spirit, thirty fluid ounces. The product should measure twenty fluid ounces. Prepared by maceration and percolation, and then adding the camphor.)

Of Aconitia:—

Unguentum Aconitiæ. Ointment of Aconitia. [Not officinal in U. S. P.] (Aconitia, eight grains; rectified spirit, half a fluid drachm; prepared lard, one ounce.)

The Alkaloid Aconitia is prepared by thoroughly exhausting the root by maceration and percolation with rectified spirit; distilling off the spirit, and making a watery solution (with boiling water) of the alcoholic extract; the solution is filtered, and ammonia added in slight excess to the filtered liquid, which is gently heated, the precipitate separated on a filter and dried. The precipitate is powdered and treated with successive portions of ether; the ether is distilled off, and the dry ethereal extract dissolved in warm water, acidulated with sulphuric acid, and again precipi-

tated with ammonia. Lastly, the precipitate is washed on a filter with a little cold distilled water, and dried between folds of blotting paper.

Therapeutics. Given internally in small doses, aconite produces tingling of the lips and tongue, a peculiar sensation at the palate and pharynx, and warmth at the epigastrium; in large doses tingling may occur in the extremities, followed by numbness, and a feeling of faintness, with weak and often intermitting action of the heart, and occasionally diuresis; pain, if present, is diminished or removed; if the dose is still larger, alarming symptoms of vascular depression are produced. Externally aconite causes at first a tingling of the part, succeeded by numbness, and cessation of local pain. It appears to cause contraction of the pupil, both when topically applied and when taken internally. [In several cases of poisoning by aconite, seen by the editor, the pupils were moderately dilated, and nausea and vomiting were present.]

Aconite has been used internally in the treatment of rheumatism, acute and chronic gout, neuralgia and carcinomatous affections, to relieve pain; in hypertrophy and other diseases of the heart, to allay palpitation; in dropsies, on account of its occasional diuretic properties, &c.; but it is at the present time rarely employed as an internal remedy, on account of its powerful and often alarming effects. Externally applied in the form of the liniment, it is very valuable in different forms of neuralgia, and in chronic rheumatic pains. *Aconitia* has the same properties as the Aconite leaf or root, and in fact imparts to the different parts of the plant their virtues; it is not given internally, as the one-fiftieth part of a grain may cause very alarming symptoms, but it is much used as an external remedy in the form of the ointment. Sometimes much irritation of the skin is produced by its use.

Dose. Of tincture of aconite, 3 min. to 10 min. and upwards [of the tincture of aconite root of the U. S. P., the dose is from 3 to 5 drops; beyond this the dose must be cautiously increased. Of the tincture of aconite leaf, an uncertain preparation, the dose is 20 or 30 drops]; of extract of aconite, 1 gr. to 4 gr. An *alcoholic extract* is sometimes used, of which the dose should be from $\frac{1}{6}$ gr. gradually increased.

Adulteration. Aconitia is often very impure; sometimes it is mixed with Delphinia, and sometimes it contains Aconella, the other principle contained in the root and precipitated with the Aconitia. Pure aconitia in $\frac{1}{50}$ gr. dose will destroy a dog; but 1 gr. of the spurious alkaloid can often be given without much effect.

Podophyllum. Podophyllum. The dried rhizome of Podophyllum peltatum, or the American May-apple; Lin. Syst., Polyandria monogynia; called sometimes *Mandrake* in the United States, over which it is extensively diffused.

Podophylli Resina. Resin of Podophyllum; Podophylline. A resin obtained from Podophyllum by means of rectified spirit.

Description. Podophyllum occurs in thin rhizomes a few inches long and 2 lines in thickness, brown, jointed, with numerous radicles, wrinkled longitudinally, it breaks short, and is whitish internally; powder, greyish-yellow, with a sweet odour and sweetish acrid taste.

The *resin or Podophylline* is a pale greenish-brown amorphous powder, and is prepared by the following process:—Podophyllum root in coarse powder is exhausted by percolation with rectified spirit. The spirit is then distilled off, and the remaining liquid slowly poured into three times its volume of water acidulated with hydrochloric acid. The deposited resin is afterwards washed on a filter with distilled water, and dried.

Prop. & Comp. Podophyllum contains resinous matters, together with gum and other substances soluble in water; the resin constitutes about $3\frac{1}{2}$ per cent. of the root, and is soluble in rectified spirit and ammonia; it is precipitated from the former by water, from the latter by acids. It is almost entirely soluble in pure ether. Berberine is stated to exist in the root, and to be contained in much of the commercial podophylline. Berberine is contained in larger quantities in the Hydrastis canadensis, and in other plants belonging to the order Ranunculaceæ, also in the Cocculus palmatus. It is represented by the formula (C_{40} H_{17} NO_8).

Therapeutics. Podophyllum and its resin act as drastic cathartics very much like jalap; they are used in congestions of the

liver or portal system; and combined with calomel, and bitartrate of potash, in dropsies.

Dose. Of the powder, about 10 gr. to 20 gr.; of the resin (podophylline), $\frac{1}{4}$ gr. to 2 gr.

Helleborus. (Not officinal.) [Officinal in U. S. P.] The rhizome and root of the Helleborus niger, Christmas Rose, or Black Hellebore; Lin. Syst., Polyandria polygynia; inhabiting Central Europe; imported from Marseilles and Hamburg

Description. Dark brown rhizomes with numerous rootlets when cut, exhibiting a whitish appearance.

Prop. & Comp. Taste very acrid and bitter, but sweetish at first; it has been stated to contain a crystalline principle, *Helleborin*, but this statement has not been as yet confirmed; besides which, gallic acid, an acrid oil, and resin, salts, &c., have been found.

Tinctura Hellebori, *Lond.* 1851. Tincture of Hellebore. (Hellebore, bruised, five ounces; proof spirit, two pints. Macerate for seven days, then press and strain.)

Therapeutics. In full medicinal doses, it is a powerful drastic purgative, stated also to be emmenagogue: little used in this country at present; formerly employed in cerebral affections, and melancholia.

Dose. Of the powder, 5 gr. to 20 gr.; of the tincture, $\frac{1}{2}$ fl. drm. to 1 fl. drm.

Staphisagria. (Not officinal.) The seed of Delphinium Staphisagria or Stavesacre; Lin. Syst., Polyandria trigynia; inhabiting chiefly the southern parts of Europe.

Description. The seed is irregularly triangular, of a brownish black colour, deeply pitted on the surface.

Prop. & Comp. No odour, acrid taste, contains an alkaloid, *Delphinia* (C_{27} H_{19} NO_2?), together with resin, fatty matter, wax, lignin, &c.

Therapeutics. Stavesacre appears to act as an emetic and purgative, when given internally, and has been used as an anthelmintic; it seems also to possess narcotic properties. Externally it has the power of destroying pediculi, and may be used in powder or ointment.

Dose. 3 gr. to 10 gr., in powder and decoction; very seldom used.

Actæa racemosa. (Not officinal.) The root of Actæa or Cimicifuga racemosa. Black Snake Root. [Cimicifuga. The root of C. Racemosa. U. S.]

This remedy, which has been much used in America, has lately been introduced into this country. Its use is said to have been attended with much success in rheumatic fever, in chorea, and in lumbago, and in some forms of puerperal hypochondriasis.

The tincture, made by macerating four ounces of the root in a pint of spirit, is the most convenient form of administering it; it may be given in doses of from thirty to sixty minims three times a day. [Extractum Cimicifugæ fluidum. U. S. Made by percolating finely-powdered cimicifuga first by stronger, and then by diluted, alcohol; the two percolates are then separately evaporated, mixed and filtered. The proportions are such, that 16 ounces of the root make 16 ounces of the fluid extract. The dose is from fifteen to twenty minims.]

MAGNOLIACEÆ.

Cortex Winteri. (Not officinal.) Winter's Bark. The bark of Drymis Winteri, or Drymis Aromatica; Lin. Syst., Polyandria tetragynia; a large tree found by Captain Winter, in 1578, on the coasts of the Straits of Magellan. Grows also in Chili, Peru, and New Granada.

Description. It occurs in large quills, a foot or more in length, and from 1 to 2 inches in width. The bark itself varies from $\frac{1}{8}$ to $\frac{1}{4}$ of an inch in thickness; externally it is reddish yellow, with dark red spots; internally, cinnamon colour. It has a powerful aromatic odour, and hot taste.

Prop. & Comp. Winter's bark contains a *volatile oil*, lighter than water, *resin*, and some *tannin;* hence its solution strikes black with salts of iron; in the analysis of this bark *oxide of iron*, *sulphate of potash* and other salts, are given as constituents.

Therapeutics. A warm aromatic stomachic and tonic, useful in atonic dyspepsia. It was originally given in scurvy.

Dose. 30 gr. to 60 gr., in powder, or made into an infusion.

Adulteration. Canella alba is often substituted for Winter's

bark; it is distinguished by being much lighter in colour, especially on the inner surface, and containing no tannin, and no soluble sulphate; the infusion of canella, therefore, does not strike black with iron salts, and is not precipitated by chloride of barium. Therapeutically the substitution is of little or no consequence.

Illicium anisatum. Star Anise.

The fruit of this plant, belonging to the order Magnoliaceæ, yields an oil which resembles true anise oil very closely, and which is now made officinal under the name of Oleum Anisi, in conjunction with the oil from the umbelliferous fruit.

MENISPERMACEÆ.

Calumba. Calumbo. The root of the Cocculus palmatus, Calumba plant; Lin. Syst., Diœcia hexandria; sometimes called Columbo root; the name was supposed to be derived from Columbo, the modern capital of the island of Ceylon, but it is imported from the Mozambique (Africa).

Description. It occurs in small cylindrical pieces, which are cut into thin disks. These vary in diameter from $\frac{1}{2}$ inch to 2 or 3 inches, and in thickness from 2 to 4 lines; the central portion is spongy, yellow, and in concentric layers; the outer portion dark green or olive; the slices usually become concavo-convex in the drying, and thinner in the centre.

Prop. & Comp. Calumbo root has little odour, but a very bitter taste. It contains a neutral non-nitrogenized crystallizable principle, called *Calumbine* (C_{42} H_{22} O_{14}), but slightly soluble in water or proof spirit; an acid called *Calumbic* (C_{42} H_{21} O_{14}), and an alkaloid, *Berberine* (C_{40} H_{17} NO_8), the salts of which are soluble, and yellow; and give the colour to the root. The calumbate of berberine is contained in the infusion and tincture. Berberine was first found in the Berberis vulgaris, and hence its name. It must not be confounded with Beberia, which is officinal, and which is obtained from Bebeeru Bark. There exists also much starch in the root.

Off. Prep. Extractum Calumbæ. Extract of Calumbo. [Not officinal in U. S. P.] (Calumbo, in powder, one pound; proof spirit, eighty ounces. Prepared by maceration, percolation, and evaporation to a proper consistence.)

Infusum Calumbæ. Infusion of Calumbo. (Calumbo, in coarse powder, half an ounce; cold distilled water, ten fluid ounces.) [From half a troy ounce of powdered Calumbo, a pint of infusion is obtained by percolation. U. S.] An infusion made with cold water.

Tinctura Calumbæ. Tincture of Calumbo. (Calumbo, bruised, two ounces and a half; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.) [From four troy ounces of powdered Calumbo, two pints of tincture are obtained by percolation with diluted alcohol. U. S.]

Therapeutics. Calumbo is a bitter stomachic and tonic, useful in debility of the digestive organs, and hence valuable in the non-inflammatory forms of gastrodynia, pyrosis, and vomiting; also as a general tonic, especially in the early stages of convalescence from acute diseases; it is often usefully combined, in stomachic affections, with an alkali or alkaline bicarbonate, or with the nitrate of bismuth or hydrocyanic acid.

Dose. Of the powder, 10 gr. to 20 gr., or more; of the extract, 2 gr. to 6 gr.; of the infusion, 1 fl. oz. to 2 fl. oz.; of the tincture, ½ fl. drm. to 2 fl. drm.

Incompatibles. The infusion of calumbo now contains no starch in solution, and hence does not strike blue with iodine. Calumbo may be given with salts of iron, as it contains neither tannin nor gallic acid.

Adulteration. Tinged bryony root, also the root of the Frasera Walteri, and of a Menisperm from Ceylon, have been substituted for true calumbo.

Pareira. Pareira. The dried root of the Cissampelos Pareira, or Velvet Leaf; Lin. Sys., Dicœcia dodecandria; a plant growing in the West Indies and South America.

Description. It occurs in more or less cylindrical-shaped pieces, entire or split longitudinally ½ an inch to 4 inches in diameter, and 4 inches to 4 feet in length; externally brownish, wrinkled both longitudinally and transversely; internally yellowish-grey, with concentric circles and radiating rays, and very open or cancellated in structure.

Prop. & Comp. Odour very slight, taste, sweetish and then

bitter. It contains a crystalline nitrogenized principle, named *Pelosine* or *Cissampeline* (C_{36} H_{21} NO_6), a strong base; besides which there exists some resin, a bitter yellow matter, starch, salts, &c.

Off. Prep. Decoctum Pareiræ. Decoction of Pareira. (Pareira, sliced, one ounce and a half; distilled water, one pint and a half. Boil to a pint, and strain.) [The only officinal preparation of Pareira in the U. S. P. is the infusion made by macerating a pint of boiling water for two hours in a troy ounce of bruised Pareira.]

Extractum Pareiræ Liquidum. Liquid Extract of Pareira. (Pareira, in coarse powder, one pound. Prepared by maceration and percolation of the powder with water, evaporation to thirteen fluid ounces, and subsequent addition of three fluid ounces of rectified spirit.)

Each fluid part of the extract contains a solid part of the root.

Therapeutics. Pareira is a bitter tonic, like calumbo, but scarcely ever used as such; it is thought to act as a diuretic, and to have an action on the mucous membrane of the bladder. Its use is chiefly confined to chronic catarrhal affections of that viscus, to allay irritation and diminish the mucous discharge; it may be combined with nitric acid or an alkali, according to the state of the urine; it is used also in chronic pyelitis.

Dose. Of powder, 30 gr. to 60 gr.; of the decoction, 1½ fl. oz. to 3 fl. oz.; of the liquid extract, ½ fl. drm. to 2 fl. drm.

Adulteration. Roots and stems of other plants are stated to have been occasionally substituted, which have yielded much less extractive matter.

Cocculus. Cocculus Indicus. The fruit of Anamirta or Menispermum Cocculus, the Cocculus Indicus plant; Lin. Sys.; Diœcia dodecandria; a climbing shrub, growing in the East India Islands and Malabar coast, &c. [Not officinal in U. S. P.]

Description. A berry, between a pea and a bayberry in size, consisting of a dark brown exterior, enclosing a wrinkled, bivalved shell, and a reniform yellowish and oily seed, which should fill at least two-thirds of the shell.

Prop. & Comp. Cocculus fruit contains a non-nitrogenized

crystalline neutral principle, *Picrotoxine* (C_{10} H_6 O_4), which resides in the kernel and forms colourless stellate needles ; also an alkaloid, *Menispermine* (C_{18} H_{12} NO), united with an acid, *Cocculinic acid*, contained chiefly in the shell.

Off. Prep. Unguentum Cocculi. Ointment of Cocculus. (The seeds of Cocculus Indicus, eighty grains ; prepared lard, an ounce.)

Therapeutics. Cocculus Indicus, as well as picrotoxine, act upon the nervous system as intoxicating agents, apparently upon the cerebellum ; they are not, however, used internally in medicine. Externally, in the form of the ointment, Cocculus Indicus is employed to destroy pediculi, and it is likewise occasionally used in chronic skin diseases.

PAPAVERCEÆ.

Papaver. Poppy Capsules. The nearly ripe Capsules of Papaver somniferum, the Garden, or Opium Poppy ; Lin. Syst., Polyandria monogynia; a native of Syria and Egypt, cultivated in Britain.

Description. The ripe fruit, poppy-heads, or capsules, are globular, from 2 to 4 inches in diameter ; of a pale brownish-yellow colour, smooth, with a radiating stigma on the top ; within are parietal placentæ, and very numerous small pale brownish, reniform seeds ; the texture of the heads is light and papery, with little or no odour, and some bitterish opiate taste.

Prop. & Comp. Besides woody fibre, &c., the capsules contain a small amount of the principles found in opium ; and the seeds, called maw seeds, have much bland oil (poppy-oil), but possess no narcotic properties. When gathered unripe, more opium is present in the capsules.

Off. Prep. Decoctum Papaveris. Decoction of Poppy-heads. [Not officinal in U. S. P.] (Poppy-heads bruised and free from seeds, four ounces ; distilled water, three pints. Boil for fifteen minutes and strain. The product should measure thirty-two fluid ounces.

Syrupus Papaveris. Syrup of Poppy. [Not officinal in U. S. P.] (Poppies bruised, the seeds being removed, thirty-six

ounces; refined sugar, four pounds; boiling distilled water, twenty pints; rectified spirit, sixteen fluid ounces. Macerate the poppy capsules in the water for twelve hours; evaporate and strain; reduce the strained liquor to three pints, and when quite cold add the spirit, mix and filter; distil off the spirit, evaporate the remaining liquor to two pints, and then add the sugar.) The product should weigh six pounds and a half, and should have the sp. gr. 1·320.

Therapeutics. Syrup of poppies acts in the same manner as opium, but is much weaker, and less certain in its action than most of the officinal preparations of that drug. The decoction is not given internally, but is employed as an external application to allay pain and soothe.

Dose. Of the syrup, 1 fl. drm. to ½ fl. oz.; for children, ½ fl. drm., cautiously increased, these patients being very susceptible of the influence of opium.

Opium. Opium; Turkey Opium. The juice from the incised unripe fruit of Papaver somniferum, hardened in the air.

Morphiæ Hydrochloras. Hydrochlorate of Morphia. The Hydrochlorate of an alkaloid, prepared from opium.

Synonym. Morphiæ Murias. [U. S.] *Edin. Dub.*

Description. Opium is prepared by making horizontal incisions with a sharp instrument, into poppy capsules, a few days after the petals have fallen, taking care not to penetrate the interior; a milky juice exudes, which soon becomes brown, and forms tears; these, when scraped off, and wrought together into masses or cakes, form opium: it is usually enveloped with some leaf.

Of *Turkey opium* there are two varieties, viz., Smyrna and Constantinople. *Smyrna* opium occurs in masses more or less flattened, from ¼ to 2 pounds in weight, covered externally with the capsules of a species of rumex; internally, when fresh, it is soft, of a rich brown colour, heavy narcotic odour and bitter taste; it is made up of agglutinated tears. *Constantinople* opium is met with in small lenticular masses, from ¼ to ½ a pound in weight, often inclosed in a poppy leaf, and marked with the midrib; it was at one time inferior to the Smyrna variety.

Besides Turkey opium, there are several other kinds, which are

however not officinal, and should not be employed in making the Pharmaceutic preparations of the drugs; among these are—

Egyptian opium, in flat cakes, more or less circular, and about two or three inches in diameter, covered with some leaf (perhaps the poppy); internally hard, of a dark reddish-brown colour, and a musty narcotic odour: it is met with in English commerce, but is very inferior to Turkey opium.

East Indian opium is found in round balls, like twenty-four pound shot, about 4 pounds in weight; covered with a thick case of poppy leaves, agglutinated; internally rather soft and black; called *Chinese investment* opium. East Indian opium also occurs in cakes, called *Malwa*, and *Garden Patna* opium. Nearly all the Indian opiums are inferior to Turkey opium, and are not found in English commerce.

Other varieties of opium, such as *Persian*, or Trebizond, in sticks, or occasionally in masses, and *European* opiums, as English, French, and German, are now and then met with.

Hydrochlorate of Morphia should be in a crystalline form.

Prop. & Comp. Opium is rich in crystalline principles; it contains a peculiar acid, and several alkaloids and neutral bodies, the most important of which are as follows:—

Meconic Acid (3 HO, C_{14} HO_{11} + 6 HO), in crystalline, pearly scales; it is soluble in water; and forms insoluble salts, with lime, baryta, and oxide of lead; meconic acid strikes blood red with persalts of iron; it is easily decomposed.

Morphia (C_{34} H_{19} NO_6), an alkaloid in the form of six-sided prisms; soluble in alcohol, and caustic fixed alkaline solutions; very slightly so indeed in ether or water; its solutions are reddened by nitric acid: it has the power of liberating iodine, and hence bluing starch, when added to iodic acid; morphia, and its salts, strike blue with persalts of iron; and when the solutions are treated with free chlorine, and excess of ammonia afterwards added, a brown colour is produced, disappearing with excess of chlorine.

Acetate of Morphia (not officinal), [Officinal in U. S. P.] occurs in very fine needles; generally in powder; apt to lose a part of its acid; soluble in water and alcohol. Composition (C_{34} H_{19} NO_6, C_4 H_3 O_3 + HO).

Hydrochlorate of morphia when pure is found in plumous acicular crystals; requires about twenty parts of water to dissolve it; soluble in spirit; when pure, both this salt and the acetate are entirely dissipated at a red heat. Composition (C_{34} H_{19} NO_6, H Cl + 6 HO). The aqueous solution gives a white curdy precipitate with nitrate of silver, and a white one with potash, redissolved by excess. Moistened with strong nitric acid, it becomes orange red, with perchloride of iron greenish blue. Twenty grains of the salt dissolved in half an ounce of warm water, with ammonia added in the slightest possible excess, give on cooling a crystalline precipitate, which when washed with a little cold water, and dried by exposure to air, weighs 15·18 grains.

[Morphiæ Sulphas. Sulphate of Morphia, U. S. Made by dissolving morphia in dilute sulphuric acid, evaporating and crystallizing. In snow-white, feathery, crystals, wholly soluble in water. Composition C_{34} H_{19} NO_6, SO_3 + 5 HO.]

Codeia (C_{36} H_{21} NO_6+2 HO), an alkaloid, in rhombic prisms, or octahedral crystals soluble in alcohol and ether, and also in boiling water, but not in alkaline solutions; does not exhibit the tests given above for Morphia; it forms crystallized salts with acids.

Papaverina (C_{40} H_{21} NO_8), an alkaloid in small acicular crystals; the crystals turn blue with oil of vitriol, and the solution gives rise to a very insoluble hydrochlorate in brilliant prisms, when great excess of the acid is added.

Thebaia or *Paramorphia* (C_{38} H_{21} NO_6), an alkaloid, not soluble in alkalies; dose not give the tests of morphia; crystallizes in square plates of a silvery lustre.

Narcotine (C_{46} H_{25} NO_{14}), neutral, in brilliant prisms, insoluble in water and alkalies; soluble in alcohol, ether and acids, with the latter of which it forms acid crystalline salts.

Narceia (C_{46} H_{29} NO_{18}), neutral silky crystals, insoluble in ether; a feeble base, reddened by strong sulphuric acid.

Meconine or *Opianyl* (C_{20} H_{10} O_8), neutral, in acicular crystals; exists in opium, but can be formed by the oxidation of narcotine.

Opianine, a principle found as yet only in Egyptian opium, has been but very imperfectly examined.

Porphyroxine, a principle whose composition is unknown; dis-

tinguished by becoming purple when heated with dilute hydrochloric acid; crystalline, but little understood.

Besides these crystallizable bodies, opium contains several different *Resins*, as yet but little examined, also gummy, extractive, and fatty matters, caoutchouc, a trace of *volatile oil*, and inorganic salts. Analyses of opium have given the following per-centage of constituents: Morphia, 6 to 12; Codeia, less than 1; Narcotine, 6 to 8; Narceine, less than 1; Meconine, less than 1; Meconic acid, 6 to 8; Resin, 10·93; Bassorine, caoutchouc, fat and lignin, 26·25; salts and volatile oil, 3·60; earthy salts, &c., 0·71; brown acid, gum, &c., 41·17.

The British Pharmacopœia gives the following tests for ascertaining the quantity of morphia present in opium:—

Take of opium 100 grains, slaked lime 100 grains, distilled water 4 ounces. Break down the opium, and steep it in 1 ounce of the water for 24 hours, stirring the mixture frequently. Transfer it to a displacement apparatus, and pour on the remainder of the water in successive portions, so as to exhaust the opium by percolation. To the infusion thus obtained, placed in a flask, add the lime, boil for ten minutes, place the undissolved matter on a filter, and wash it with 1 ounce of boiling water. Acidulate the filtered fluid slightly with dilute hydrochloric acid, evaporate it to the bulk of ½ an ounce, and let it cool. Neutralize cautiously with solution of ammonia, carefully avoiding an excess; remove by filtration the brown matter which separates, wash it with 1 ounce of hot water, mix the washings with the filtrate, concentrate the whole to the bulk of ¼ of an ounce, and add now solution of ammonia in slight excess. After 24 hours collect the precipitated morphia on a weighed filter, wash it with cold water, and dry it at 212°. It ought to weigh at least from 6 to 8 grains.

Off. Prep.—Of Opium. Emplastrum Opii. Opium Plaster. [Extract of Opium, a troy ounce; Burgundy pitch, three troy ounces; lead plaster, twelve troy ounces; water a sufficient quantity. U. S.] (Opium, in very fine powder, one ounce; resin plaster, nine ounces.)

Enema Opii. Enema of Opium. (Decoction of starch, two fluid ounces; tincture of opium, thirty minims. Mix.) [Not officinal in U. S. P.]

Extractum Opii. Extract of Opium. (Opium, in thin slices, one pound; distilled water, six pints. Prepared by macerating the opium, three times, for twenty-four hours each time, in two pints of water, mixing the liquors, straining and reducing by evaporation to a proper consistence.)

Extractum Opii Liquidum. Liquid Extract of Opium. (Extract of opium, one ounce; distilled water, seventeen fluid ounces; rectified spirit, three fluid ounces.) [Not officinal in U. S. P.]

Linimentum Opii. Liniment of Opium. (Tincture of opium, two fluid ounces; liniment of soap, two fluid ounces.) [Not officinal in U. S. P.]

Pilula Opii. Opium Pill. (Opium, in fine powder, half an ounce; hard soap, two ounces; distilled water, a sufficiency.) [Opium, in fine powder, sixty grains; soap, in fine powder, twelve grains. Beat them, with water, into a pilular mass, to be divided into sixty pills. U. S.]

One grain of opium is contained in five grains of the pill mass.

Pilula Plumbi cum Opio. Pill of Lead and Opium. (Acetate of lead, in fine powder, thirty-six grains; opium, in powder, six grains; confection of roses, six grains.) [Not officinal in U. S. P.]

One grain of opium is contained in eight grains of the pill mass.

Pulvis Cretæ Aromaticus cum Opio. Aromatic Powder of Chalk and Opium. (Aromatic powder of chalk, nine ounces and three quarters; opium, in powder, a quarter of an ounce.)

One part of opium in forty parts of the powder. [Not officinal in U. S. P.]

Pulvis Ipecacuanhæ cum Opio. Powder of Ipecacuan and Opium.

Synonym. Pulvis Ipecacuanhæ Compositus.

(Ipecacuan, in powder, half an ounce; opium, in powder, half an ounce; sulphate of potash, four ounces.)

One part of opium in ten parts of the powder. This preparation is also known as Dover's powder.

Pulvis Kino cum Opio. Powder of Kino and Opium.

Synonym. Pulvis Kino Compositus. *Lond.*

(Kino, in powder, three ounces and three quarters; opium, in powder, a quarter of an ounce; cinnamon, in powder, one ounce.)

One part of opium in twenty parts of the powder. [Not officinal in U. S. P.]

Tinctura Opii. Tincture of Opium. (Powdered opium, one ounce and a half; proof spirit, one pint. Prepared by maceration.)

One grain of dry opium is contained in fourteen minims and a half of the tincture. [Opium, dried in powder, two troy ounces and a half; water, alcohol, each a pint; diluted alcohol, a sufficient quantity. Two pints of tincture are made by maceration and percolation. A grain of dry opium is contained in 12·8 minims of the tincture. U. S.]

Tinctura Camphoræ cum Opio. Camphorated Tincture of Opium. [Tincturæ Opii Camphorata. U. S. The formula is slightly different, but the strength is the same as in the Br. Ph.] (Opium, in coarse powder, forty grains; benzoic acid, forty grains; camphor, thirty grains; oil of anise, half a fluid drachm; proof spirit, one pint. Prepared by maceration.)

One grain of opium is contained in half a fluid ounce of this tincture. This preparation is often termed *Paregoric Elixir*, was called Tinctura Camphoræ Composita, Lond. Phar. 1851.

Trochisci Opii. Opium Lozenges. (Extract of opium, seventy-two grains; tincture of tolu, half a fluid ounce; refined sugar, sixteen ounces; gum arabic, in powder, two ounces; extract of liquorice, sixteen ounces; boiling distilled water, a sufficiency. To make seven hundred and twenty lozenges.)

Each lozenge contains one-tenth of a grain of extract of opium.

[Trochisci Glycyrrhizæ et Opii. Troches of Liquorice and Opium. Opium, in fine powder, half a troy ounce; liquorice, gum arabic, sugar, all in fine powder, each ten troy ounces; oil of anise, a fluid drachm. Made into a mass, with the addition of water, and divided into troches, each weighing six grains. U. S. Each lozenge contains about one-twelfth of a grain of opium.]

Unguentum Gallæ cum Opio. Ointment of Galls and Opium. [Not officinal in U. S. P.] (Ointment of galls, one ounce; opium, in powder, thirty-two grains.)

One part of opium is contained in fourteen parts and a half of the ointment.

Vinum Opii. Wine of Opium. (Opium, in powder, one ounce and a half; sherry, one pint. Prepared by maceration.)

One grain of dry opium is contained in fourteen minims and a half of the wine.

[Opium, in powder, two troy ounces; cinnamon and cloves, each in powder, sixty grains. The powders are macerated with fifteen fluid ounces of sherry for fifteen days: the whole is then transferred to a percolator, and after the liquid is drained off, sherry wine is poured on until a pint of percolate is obtained. One grain of opium is contained in eight minims of the wine.]

Of Hydrochlorate of Morphia:—

Liquor Morphiæ Hydrochloratis. Solution of Hydrochlorate of Morphia. [Not officinal in U. S. P.] Hydrochlorate of morphia, four grains; dilute hydrochloric acid, eight minims; rectified spirit, two fluid drachms; distilled water, six fluid drachms.)

Half a grain of hydrochlorate of morphia is contained in each fluid drachm of this solution. It is half the strength of Liquor Morphiæ Hydrochloratis, London, 1851.

Suppositoria Morphiæ. Morphia Suppositories. [Not officinal in U. S. P.] Hydrochlorate of morphia, three grains; refined sugar, thirty grains; prepared lard and wax, of each a sufficiency, divided into twelve cones, covered with wax and lard.) Each suppository contains a quarter of a grain of the morphia salt.

Trochisci Morphiæ. Morphia Lozenges. [Not officinal in U. S. P.] (Hydrochlorate of morphia, twenty grains; tincture of tolu, half a fluid ounce; refined sugar, in powder, twenty-four ounces; gum arabic in powder, one ounce; mucilage of gum arabic, two fluid ounces, or a sufficiency; boiling distilled water, half a fluid ounce. Divide into 720 lozenges.) Each lozenge contains one thirty-sixth of a grain of hydrochlorate of morphia.

Trochisci Morphiæ et Ipecacuanhæ. Morphia and Ipecacuan Lozenges. [Not officinal in U. S. P.] (Hydrochlorate of morphia, twenty grains; ipecacuan, in fine powder, sixty grains; and the same ingredients in the same quantities, as for the morphia lozenges.)

Each lozenge contains one thirty-sixth of a grain of hydrochlorate of morphia, and one-twelfth of a grain of ipecacuan.

Hydrochlorate of Morphia is prepared by thoroughly exhausting opium with water, and evaporating to a small bulk,

so that one pint of fluid shall contain the soluble matter of one pound of opium. To this is added a strong solution of chloride of calcium, and the liquid evaporated till, on cooling, it forms a solid mass; which is then enveloped in two folds of calico, and subjected to a powerful pressure. The cake is then triturated with about half a pint of boiling water, the whole thrown on a filter and washed. The filtered liquor is again evaporated, and allowed to cool and solidify, pressed, dissolved as before, evaporated and again allowed to solidify; if the mass is still much coloured, this process may be again repeated. The pressed cake is finally dissolved in six ounces of boiling water with animal charcoal, for twenty minutes, and, filtered ammonia added in slight excess, and the pure crystalline morphia which separates collected and dried. This is dissolved in hydrochloric acid, and the hydrochlorate of morphia allowed to crystallize. An additional quantity of morphia may be obtained from the dark liquids expressed, by diluting them with water, precipitating with potash in excess, filtering, saturating with hydrochloric acid, and purifying with animal charcoal.

Therapeutics. Opium when taken internally, in small doses, produces, at first, some excitement of the vascular and nervous systems, shown by increased fulness and rapidity of the pulse, exaltation of the mental functions, and very pleasant sensations; these, after a time, are followed by a feeling of drowsiness, and at last by a sound sleep, often accompanied with perspiration; on awakening, the individual usually feels some nausea and headache, the tongue is furred, there is loss of appetite, thirst, and a torpid state of the bowels. If pain or spasm be present, these become relieved, at the same time the influence of the drug in producing sleep is much diminished. The stimulant effect of opium does not last long, usually not more than half an hour, and when the dose is large, and the patient unaccustomed to the drug, it is often scarcely noticed, the soporific influence being very speedily produced; certain conditions of the system and the previous long-continued use of the medicine hinder or prevent the soporific effect, but favour the development of the symptoms of excitement; when large doses are taken the sleepiness becomes intense, and there is great difficulty in awakening the patient; in still larger doses poisonous effects ensue, the sleep passing into

a condition of stupor or coma, with gradually increasing slowness of respiration, feebleness of pulse, cold perspiration, and contracted pupils, followed by death.

The influence of opium upon the different organs and functions of the body may be thus enumerated :

On the *Digestive Organs;* it impairs appetite and the digestive process, causes thirst, diminishes the secretions from the whole mucous membrane, and induces constipation.

On the *Brain* and *Nervous System* the action of opium is most powerfully exerted, as is shown in the primary exaltation of the mental faculties and the subsequent sleep and coma ; the pupils of the eyes become contracted, even to a point, when the patient is powerfully under the influence of the drug ; the spine is sometimes affected, and tetanic symptoms occur, especially when opium is given to the lower animals, in whom the cerebral effect is less marked.

On the *Vascular System;* opium acts at first as a stimulant and then as a sedative, probably both effects are induced through the medium of the nervous system ; when given in small doses, frequently repeated, the force of the circulation can be kept up for a long time.

On the *Cutaneous System;* opium causes free perspiration, an effect for which the drug is often prescribed, and which is much increased by combination with ipecacuanha, camphor, &c.

On the *Secreting* and *Excreting Organs,* with the exception of the skin, the effect of opium is to lessen their activity : the bile is diminished, as is seen in the pale-coloured fæces ; the urine often becomes scanty, and also the saliva and buccal mucus.

On the *Respiratory System,* opium produces a sedative effect, diminishing the frequency of the respirations, and hence impairing the oxidation of the blood.

On the *Sexual System,* opium acts as a stimulant, especially in males, and has been employed in Eastern countries as an aphrodisiac.

Applied to the skin opium appears to possess some power of allaying pain, and is often added to fomentations. When the cutis is denuded, the opium and morphia salts become absorbed and produce constitutional effects. Applied also to the mucous membrane of the rectum in the form of suppository or enema,

not only the local but the general symptoms of the drug are produced.

Opium is perhaps more extensively used than any other drug, and of such value is it, that it has been called the "gift of God" to man. It may be employed to allay *pain* and *spasm*, occurring in almost any condition of the system, as in the varieties of neuralgia, colic, during the passage of renal or biliary calculi, in tetanus and inflammations of various kinds; in short, pain, from whatever cause arising, is usually advantageously treated by opium.

In *Inflammation* it is given not only to assuage pain and spasm, but to control the disease; opium seems to have some power over the capillary circulation, which is advantageously made use of after depletion; perhaps this may be exercised through the medium of the nervous system; it is very commonly given, combined with calomel, in cases of inflammation, where it is valuable, not only for the influence it exerts over the disease, but also from its preventing the mercurial salt from running off by the bowels. Opium is given with tartar emetic, in several forms of inflammation. In inflammation of mucous membranes, opium may or may not be useful; when the air passages are affected, opium should be cautiously administered: but when the intestinal tube is involved, as in dysentery, its property of checking secretion and allaying irritability is of much value.

In *Fevers* opium may be sometimes used when nervous symptoms, as tremor and watchfulness, occur, attended with deficient power of the vascular system; it should always be given in small doses, and the effects watched. In intermittent fevers, or agues, opium sometimes suffices for the cure, when given before the time of accession of the cold stage; but there are other remedies which possess greater antiperiodic powers, without the narcotic properties; opium, however, may be occasionally used in intermittent cases with advantage.

In diseases of the *Nervous System*, when attended with increased vascular action, opium is generally injurious; but when there is defective power of the circulation, as in delirium tremens, and allied affections, then the value of this drug becomes very evident.

In *Hæmorrhages*, opium is often useful, especially when there has been much loss of blood, and consequent arterial excitement;

whether the drug is a direct astringent to the vascular system is doubtful; it is usually combined in such cases with acetate of lead, and gallic acid.

In *Mucous Discharges*, opium is often of service, especially in diarrhœa; sometimes also in leucorrhœa, &c.; but the condition of the system must be the guide to the administration of the drug in these cases; certain forms of ulcers, of a phagedænic character, or occurring in very weak subjects, are greatly improved by the influence of this remedy.

In *Urinary Diseases*, to lessen the amount of urine, if excessive, as in diabetes; and to allay the irritability of the bladder, occurring in many affections of the urinary organs, opium is employed with advantage.

In *Chest Affections*, this drug should be used with caution; it often allays the cough; but when the respiratory function is seriously impaired, increased dyspnœa is sometimes produced by it; opium tends to diminish the expectoration, an effect at times desirable, but often injurious.

Opium is used in the form of suppository in painful diseases of the rectum and bladder, and chordee; also as an enema in similar cases. It may be applied to the skin in the form of fomentation, over painfully inflamed joints and other parts; and as a liniment or plaster in neuralgic, rheumatic, or other diseases.

Circumstances influencing the operation of Opium.

Age has great influence; children are much more affected than adults; much more than in proportion to the age; and opium must be given with the greatest care to infants and young subjects.

Certain *individuals* are peculiarly susceptible of the action of opium; and in some, great excitement and restlessness are produced, instead of calmness and sleep.

The presence of *Disease* often gives a resisting power to the influence of this drug, especially when great pain is present.

Custom or habit has perhaps the most marked influence on its action; by gradually increasing the dose, enormous quantities may be taken without any very evident effect being produced; the want of the drug in such cases is, however, most severely felt. The author knew a young man who took 60 grains of Smyrna opium night

and morning, and frequently, in addition to this, 1 fluid ounce to 1½ fluid ounce of laudanum during the day. If the drug be discontinued, and after a time the large dose at once resumed, poisoning may occur.

Action of Morphia Salts. Morphia appears to possess the anodyne and soporific powers of opium, and gives to the drug most of its valuable properties; at the same time it, as a rule, acts more agreeably, having less tendency to produce headache and nausea; it also is much less stimulant in its operation. Other substances contained in opium must impart to the crude drug some of its power, for although only about 10 per cent. of morphia exists in good opium, yet the alkaloid has not more than four times the strength. The different salts of morphia act in the same manner, when estimated by the amount of the alkaloid contained in them.

Action of the other constituents of Opium.

Codeia is stated to act like morphia; the author questions the statement, having repeatedly found 5 grains of codeia fail to relieve pain (in the case of a patient suffering from a tumour pressing on a nerve), which was always readily subdued by the fourth of a grain of morphia. The therapeutics of codeia require to be investigated.

Narcotine was at one time supposed to be the narcotic principle of opium, but is now known not to be so; it probably acts as a tonic and antiperiodic: the author has given it with this view in half-drachm doses without the production of any narcotic symptoms.

The actions of the other crystalline principles of opium are as yet almost unknown; the resinous matter certainly possesses considerable power, and in one case in which it was administered in rather large doses, giddiness and great contraction of the pupils ensued.

Dose. Of opium, ¼ gr. to 3 gr. or more; of extract. opii, ¼ gr. to 3 gr. or more; of extractum opii liquidum, 4 min. to 40 min, or more; of tinct. opii (laudanum), 4 min. to 40 min. or more; of vinum opii, 4 min. to 40 min. or more; of pulv. cretæ aromaticus cum opio, 10 gr. to 60 gr.; of pil. opii, 2½ gr. upwards; of pulv. kino. cum opio, 10 gr. upwards; of tinctura camphoræ cum opio, 1 fl. drm. to 2 fl. drm.; of pil. plumbi cum opio, 4 gr. to 8 gr.; of

trochisci opii, one to four; of morphiæ hydrochloras, $\frac{1}{8}$ gr. to 1 gr.; of liquor morphiæ hydrochloratis, 20 min. to 2 fl. drm. [of Liquor Morphiæ Sulphatis, U. S., 30 min. to 2 fl. drm.]; of trochisci morphiæ, one to four; of trochisci morphiæ et ipecacuanha, one to four.

Adulteration. Opium often contains many mechanical impurities, as stones, sand, clay, bullets, &c.; it may also be mixed with vegetable extracts of various kinds, sugar and treacle; it may contain much water, and it may have had much of its active matter extracted by water, and subsequently dried; physical examination will throw much light on the value of the drug, but on account of its very varying quality, processes are employed for ascertaining the amount of morphia contained in it, and this is taken as the index to the commercial value of the drug. The process given above may be resorted to with advantage. Good Smyrna opium should yield 10 per cent. of morphia; Egyptian opium about 6 or 7 per cent.; East Indian, from 3 to 8 per cent. or more.

Rhœas. [Not officinal in U. S. P.] The dried petals of Papaver Rhœas, the Red or Corn Poppy; Lin. Syst., Polyandria monogynia; indigenous: growing in fields and waste places.

Description. The petals are of a rich scarlet colour when fresh, becoming dull red on drying. They have the peculiar heavy odour of opium when fresh, but become scentless on drying.

Prop. & Comp. The petals yield to water *red colouring matter*, for which they are chiefly prized: this colour is much darkened by alkalies. They contain, in addition to the red colouring matter, minute traces of the peculiar constituents of opium.

Off. Prep. Syrupus Rhœados. Syrup of Red Poppy. (Red poppy petals, thirteen ounces; boiling distilled water, one pint; sugar, two pounds and a quarter; rectified spirit, two fluid ounces and a half. Add the red poppy petals gradually to the water, heated in a water-bath, frequently stirring; then set the vessel aside, macerate for twelve hours; afterwards press out the liquid. Strain, add the sugar, and dissolve by means of heat. When cold add the spirit, and as much distilled water as may be necessary to make up for loss in the process, so that the product shall weigh three pounds ten ounces, and should have the specific gravity 1·33.)

Therapeutics. The action of red poppy is very slight, but simi-

lar to that of opium; the amount of active ingredients is very small, and rather uncertain in quantity. It is chiefly used as a colouring agent.

Dose. Of syrupus rhœados, from 1 fl. drm. upwards.

[Sanguinaria. Bloodroot. U. S. The rhizoma of Sanguinaria Canadensis; Lin. Syst., Polyandria monogynia. A perennial herb growing throughout the United States.

Description. In pieces of from one to three inches in length, half an inch in thickness, dark brown; externally, wrinkled, contorted, terminating abruptly; internally, the colour varies from whitish to a dark-red, and has, when the root is good, a resinous appearance.

Prop. & Comp. Odour faint, taste bitter, acrid, and persistent. Contains an alkaline principle, Sanguinarine, which forms with acids, salts having some shade red or scarlet.

Off. Prep. Tinctura Sanguinariæ. Bloodroot, in moderately fine powder, four troy ounces; percolate with diluted alcohol until two pints of tincture are obtained.

Therapeutics. Bloodroot is emetic, but is rarely used to produce vomiting: in moderate doses it is a useful expectorant, not impairing the appetite or quickening the circulation. In over doses its action is violent and it causes depression of the pulse and disturbance of the nervous system.

Dose. Of powder, as an emetic, from 10 to 20 gr.; of the tincture, 20 fl. drm. to ½ an ounce; as an expectorant, of the powder, 3 to 5 gr. every few hours; of the tincture, from 20 minims to a fl. drm.]

CRUCIFERÆ, OR BRASSICACEÆ.

Sinapis. Mustard. The seed of Sinapis nigra and Sinapis alba, or Black and White Mustard; Lin. Syst., Tetradynamia siliquosa: plants common in Europe.

Description. Black mustard seeds are very small, round, wrinkled, and brownish-black on the surface, yellow within; white mustard seeds are larger, and yellow on the surface. The seeds reduced to powder are the officinal part.

Prop. & Comp. When crushed, both seeds yield the flour of

mustard; the best is made from the mixed seeds; when dry, it has little or no odour, but an acrid, bitterish, oily, pungent taste, and gives off, when moist, a peculiar pungent smell, very irritating to the eyes and nostrils. Both seeds contain a *fixed oil*, from 25 to 35 per cent. Black mustard contains no *volatile oil* ready formed, but a principle named *myronic acid*, united with potash, containing about ½ per cent.; the myronate of potash has the composition ($KO, C_{20} H_{19} NO_{18}$) and by the action of an albuminous matter also contained in the seed, and termed *myrosine*, breaks up, in the presence of water, into the oil of mustard, sugar, and probably bisulphite of potash. The volatile oil of mustard is of a slight yellow colour; sp. gr. about 1·03; very pungent and acrid; has the composition ($C_8 H_5 NS_2$) or $C_6 H_5, C_2 NS_2$), Sulphocyanide of Allyle. White mustard does not yield the volatile oil, but contains a crystallisable compound, *sulphosinapisin*, which gives rise to an acrid but not volatile principle, containing sulphur. This compound has been supposed to be the hydrosulphocyanide of a peculiar alkaloid sinapine ($C_{32} H_{23} NO_{10}$.) The fixed oil of mustard contains *erucic* acid ($HO, C_{44} H_{41} O_3$). A decoction of flour of mustard, when cooled, should not be made blue by tincture of iodine, indicating the absence of starch.

Off. Prep. Cataplasma Sinapis. Mustard Cataplasm. [Not officinal in U. S. P.] (Boiling water, ten fluid ounces; powdered linseed, powdered mustard, of each two ounces and a half. By degrees add the powders, first well mixed, to the water; keep stirring that a cataplasm may be formed.) Too hot water, or alcohol, or vinegar are apt to injure the production of the volatile oil.

Therapeutics. Mustard seeds and flour act as powerful stimulants. Internally, in large doses, mustard causes speedy vomiting (useful in narcotic poisoning); in smaller doses, as a condiment, it assists digestion. The entire seed was formerly used, and now and then caused ill effects, from accumulating in the intestines. Externally, in the form of *cataplasma sinapis*, it is a powerful rubefacient, useful in slight inflammations, head affections, neuralgic and other pains and spasms.

Dose. As an emetic, from one teaspoonful to a tablespoonful mixed with a little water.

Adulteration. Flour of mustard is extensively mixed with common flour, pepper, chilies, turmeric, &c.

Armoracia. Horseradish. The recent root of Cochlearia Armoracia [not officinal in U. S. P.]; Lin. Syst., Tetradynamia siliculosa: common throughout Europe, cultivated in Britain.

Description. A long, white, tap-shaped root, familiar to all.

Prop. & Comp. When scraped, it emits a very pungent odour, and has an acrid taste, depending on a *volatile oil* ($C_8 H_5 NS_2$) identical with oil of mustard; probably the oil is formed as in the black mustard seed.

Off. Prep. Spiritus Armoraciæ Compositus. Compound Spirit of Horseradish. (Horseradish sliced, dried orange peel, each twenty ounces; bruised nutmeg, half an ounce; proof spirit, a gallon; water, 2 pints. Mix them; let a gallon distil with a moderate heat.)

Therapeutics. The same as mustard; seldom employed in the fresh state except as a condiment. The officinal preparation is used in atonic dyspepsia; also as a sudorific in chronic rheumatism, &c. As a syrup it has been slowly swallowed in hoarseness, an infusion is also occasionally prescribed.

Dose. Of spiritus armoraciæ c., 1 fl. drm. to 3 fl. drm.

VIOLACEÆ.

Viola. Violet. (Not officinal.) The recent petals of Viola odorata, the Sweet Violet; Lin. Syst., Pentandria monogynia: indigenous.

Description. Small petals, having a very agreeable characteristic odour and colour. The root has been used as a medicine.

Prop. & Comp. The infusion, which is not strongly coloured, becomes bright red on the addition of an acid, and green with an alkali, and hence employed as a test. Besides the above *colouring matter*, the petals contain a *volatile oil* and a little acrid matter, *violine*, which can be separated as a white powder, and somewhat resembles emetina.

Prep. Syrupus Violæ, *Lond.*, 1851. Syrup of Violet.

(Violets, nine ounces; boiling distilled water, one pint; sugar, three pounds, or as much as may be necessary; rectified spirit, two fluid ounces and a half, or as much as necessary. Macerate the violet flowers in water for twelve hours, then press and strain. Set aside that the dregs may subside, and complete the process as directed for syrup of marsh-mallow.)

Therapeutics. Violets are used in medicine for their colour, and on account of the slight laxative effect of the syrup, which is given to very young children, either alone, or mixed with almond oil. The root is purgative, and emetic in half-drachm or drachm doses.

Dose. Of syrupus violæ, ½ drm. to 2 drm.

Adulteration. Sometimes the petals of the scentless species are substituted for those of the sweet violet; of little therapeutic importance.

POLYGALACEÆ.

Senega. Senega; the root of Polygala Senega; Lin. Syst., Diadelphia octandria: a small plant growing in the United States of America.

Description. Root-stock, or knotty head with roots proceeding from it about the thickness of a quill, twisted and keeled. Bark yellowish brown, interior wood tasteless, inert.

Prop. & Comp. Taste sweetish, and acrid to the fauces; it contains a principle called *senegin* or *polygalic* acid, obtained as a white powder, with some tannin, pectin, gum, &c. The active part of the root is the cortex.

Off. Prep. Infusum Senegæ. Infusion of Senega. (Senega, bruised, half an ounce; boiling distilled water, ten fluid ounces.)

Tinctura Senegæ. Tincture of Senega. [Not officinal in U. S. P.] (Senega, bruised, two ounces and a half; proof spirit, twenty fluid ounces; prepared by maceration and percolation.)

[Decoctum Senegæ. Decoction of Seneka; a troy ounce of seneka is boiled for fifteen minutes, strained and enough water added to make up a pint. Syrupus Senegæ. Syrup Seneka. Seneka, in moderately fine powder, four troy ounces; sugar in coarse powder, fifteen troy ounces; diluted alcohol two pints. The Sen-

eka is percolated with the alcohol, and the tincture is evaporated to half a pint, filtered, the sugar added and dissolved by the aid of heat. U. S.]

Therapeutics. Senega root is a stimulant to the mucous membranes and skin, acting especially on the bronchial tubes. It is chiefly employed in asthenic and chronic bronchitis; also in dysmenorrhœa and albuminuria: often combined with sesqui-carbonate of ammonia, and other expectorants and diuretics.

Dose. Of powder 20 gr. to 60 gr.; of the infusium senegæ, 1 oz. to 2 fl. oz.; of the tinctura senegæ, ½ fl. drm. to 2 fl. drm. [Of the decoction 1 to 2 fl. oz., of syrup 1 to 3 fl. drm.]

Adulteration. Ginseng, or root of Panax quinquefolium; also Gillenia, detected by absence of the line running along the true senega root.

Krameria. Rhatany, the dried root of Krameria triandra; Lin. Syst., Tetrandria monogynia: growing in Peru and Chili.

Description. Generally a large root-stock about an inch in diameter, with long roots from one-sixth to half an inch thick proceeding from it. Externally, dark red or reddish brown; internally, paler red. The powder is red.

Prop. & Comp. Rhatany has no odour, but a sweetish astringent taste, tinging the saliva very red. It contains *krameric acid*, of which little is known, about 40 per cent. of *tannin*, and a red astringent matter. These are all soluble in water and alcohol.

Off. Prep. Extractum Krameriæ. Extract of Rhatany. (Rhatany in coarse powder, one pound; distilled water, a gallon. Prepared by maceration, percolation, and subsequent evaporation.)

Infusum Krameriæ. Infusion of Rhatany. (Rhatany, half an ounce; boiling distilled water, ten fluid ounces.) [Rhatany, in moderately coarse powder, a troy ounce. A pint of infusion is made by percolation with cold water. U. S.] [Rhatany, in moderately fine powder, six troy ounces; two pints of tincture are obtained by percolation with diluted alcohol. U. S.]

Tinctura Krameriæ. Tincture of Rhatany. (Rhatany bruised, two ounces and a-half; proof spirit, one pint; prepared by mac-

eration and percolation.) Rhatany is also contained in pulvis catechu compositus.

Therapeutics. A powerful astringent; may be used whenever tannin is indicated. The powder has had much repute as a dentifrice when the gums are bleeding or spongy. It may also be employed as a gargle or injection in relaxed sore throat, leucorrhœa, and prolapsus ani, in the form of the infusion.

Dose. Of the powder, 20 gr. to 60 gr.; of extract krameriæ, 2 gr. to 20 gr.; of inf. krameriæ, 1 fl. oz. to 2 fl. oz.; of tinct. krameriæ, ½ fl. drm. to 1½ fl. drm.

LINACEÆ.

Lini Semen. The seed of Linum usitatissimum; common Linseed or Flax; Lin. Syst., Pentandria pentagynia: an indigenous plant.

Lini Farina. Linseed Meal.

Lini Oleum. Linseed Oil.

Description. The *seed* is small, oval, oblong, and flattened, pointed at one end; dark brown and shining on the surface, and white within. The *flour* or linseed meal, consists of the seeds ground and deprived of their oil by expression. The *oil* is of a light yellow colour, similar in appearance to most other vegetable oils.

Prop. & Comp. The seeds contain a *fixed oil*, about 20 per cent., and *mucilage*, together with the ordinary constituents of seeds; the oil is found in the kernel, the mucilage in the envelope or testa of the seed. After the expression of the oil, the marc which remains is called linseed or oil-cake: and when powdered, linseed meal. The fixed oil, sp. gr. 0·93, rapidly absorbs oxygen from air and forms a varnish, hence called a drying oil; it contains *oleine* and *margarine*. The oleic acid from linseed oil differs somewhat from ordinary oleic acid.

Off. Prep. of the Meal. Cataplasma Lini. Linseed Poultice. [Not officinal in U. S. P.] (Boiling water, ten fluid ounces; linseed meal, four ounces; olive oil, half a fluid ounce. Mix the linseed meal with the oil, then add the water gradually, constantly stirring.)

Of the Seed. Infusum Lini. Infusion of Linseed. [Infusum Lini Compositum. U. S.] (Linseed, one hundred and sixty grains; fresh liquorice, sliced, sixty grains; boiling distilled water, ten fluid ounces.)

Therapeutics. Internally, when given in the form of the infusion linseed is demulcent, from the mucilage and the little oil contained in it, and has been employed in catarrhal and urinary affections; also in diarrhœa and dysentery. Externally, linseed powder is used as a poultice to inflamed and suppurating parts. The oil is a useful emollient to burns or scalds, either alone or mixed with lime-water, and the Linimentum Calcis, *Edin.*, is made with it in place of olive oil.

Dose. The infusion may be taken *ad libitum.*

Linum Catharticum, or Purging Flax, was contained in the Edinburgh Pharmacopœia, 1848. The dried plant is used made into infusion, and given in doses of about thirty grains; it has no particular value as a purgative.

MALVACEÆ.

Althæa. Marsh-mallow. (Not officinal.) [Officinal in U. S. P.] The root of Althæa officinalis, or March-mallow; Lin. Syst., Monodelphia polyandria: growing throughout Europe.

Description. Small cylindrical pieces, about the size of a finger yellowish white externally, white within; the epidermis is generally removed.

Prop. & Comp. Little odour, taste sweet and mucilaginous; it contains much *mucilage*, some starch and sugar, also *altheine* ($C_8 H_8 N_2 O_5$), identical with asparagine.

Prep. Syrupus Althææ, *Lond. Ph.*, 1851. Syrup of Marsh-mallow. (Marsh-mallow, sliced, one ounce and a half; sugar, three pounds, or as much as may be necessary; distilled water, one pint; rectified spirit, two and a half fluid ounces, or as much as may be necessary. Macerate the march-mallow in the water for twelve hours, press out the liquor, and strain through linen; then add of sugar twice the weight of the strained liquid, and dissolve with a gentle heat. Lastly, when the syrup has cooled, mix to each fluid ounce half a fluid drachm of spirit.)

Therapeutics. Simply a demulcent, used to allay cough, as other mucilages; much used in France, under the name Guimauve, in lozenges, &c.

Dose. Of a decoction, *ad libitum;* of the syrup, 1 fl. drm. to 1 fl. oz.

Besides the althæa, other malvaceous plants are used for the mucilage they contain, as the *Malva sylvestris*, or common mallow and the *Malva rosea*, or hollyhock.

Cotton Wool. (Appendix A.) [Gossypium. Cotton. U. S.] A filamentous substance attached to the seeds of Gossypium herbaceum and other species of this genus; Lin. Syst., Monodelphia polyandria. Carded.

[Gossypii Radix. The root of Gossypium herbaceum and other species of Gossypium. U. S.]

Description. Cotton consists of fine filaments or tubular hairs, becoming flattened by drying, which were attached to the seed-coat; these tubes have but few joints when examined by the microscope: cotton can be distinguished from linen by the fibres on the latter having tapering ends, and being aggregated in bundles. In composition it resembles lignin, or ordinary woody fibre (C_{36} H_{30} O_{30}), it is used for the preparation of pyroxylin, gun cotton.

Pyroxylin. Gun Cotton. (Appendix A.)

Prep. By immersing cotton wool in equal parts of sulphuric acid and nitric acid, afterwards well washing, and drying in a water-bath. (A weaker acid is required for making a soluble pyroxylin.)

Prop. & Comp. It is readily soluble in a mixture of ether and rectified spirit, leaves no residue when exploded by heat, it resembles cellulin in composition, with a certain number of equivalents of hydrogen, replaced by peroxide of nitrogen (C_{36} H_{22}, 8 NO_4,O_{80}). It is used in the Pharmacopœia for the preparation of collodion.

Use. Cotton is used as an application to burns and scalds, diminishing the inflammation, and aiding recovery probably from protecting the surface: occasionally employed in erysipelas. [The root is said to promote the contractions of the uterus in the parturient female. A decoction is made by boiling four ounces of

the inner bark of the root in a quart of water until it is reduced to a pint. Dose, a wine-glass full every twenty or thirty minutes.]

Collodium. Collodion.

Prep. Pyroxylin, one ounce; ether, thirty-six fluid ounces; rectified spirit, twelve fluid ounces. Dissolve the pyroxylin in the ether, mixed previously with the rectified spirit.

Prop. & Comp. A colourless highly inflammable liquid with ethereal odour, which dries rapidly upon exposure to the air, and leaves a thin transparent film, insoluble in water and rectified spirit.

Use. Collodion, when applied to the skin, leaves, on the evaporation of the ether, a thin transparent layer, and may be used to cut and inflamed surfaces, in skin diseases, and chapped nipples, to arrest hæmorrhage from leech-bites, &c.: in some of these cases it acts by forming a protecting surface; in others, through the contraction of the film constricting the vessels of the part.

AURANTIACEÆ

Aurantii Cortex. Bitter Orange Peel. The exterior rind of the fruit of Citrus Bigaradia, the Seville or bitter orange tree; Lyn. Syst., Polydelphia polyandria: growing in Southern Europe, Spain, &c. [Aurantii Amari Cortex. Bitter Orange Peel. The rind of the fruit of citrus vulgaris. Aurantii Dulcis Cortex. Sweet Orange Peel. The rind of the fruit of Citrus Aurantium. Aurantii Flores. Orange Flowers. The flowers of Citrus Aurantium and Citrus Vulgaris.]

Aurantii Floris Aqua. Orange Flower Water. Water distilled from the flower of Citrus Bigaradia, and Citrus Aurantium, the sweet orange tree, prepared mostly in France.

Description. The cortex, or rind, is well known; it has an aromatic bitter taste and fragrant odour; the interior white portion should be removed. Aqua Floris Aurantii has the grateful odour of the orange blossoms.

Prop. & Comp. The cortex, or rind, contains a *volatile oil* (C_{20} H_{16}), a *bitter extractive*, and a little *gallic acid*. Aqua Floris Aurantii contains a little *volatile oil* differing from that contained

in the cortex. The water should be colourless with a fragrant odour. It should not be coloured by sulphuretted hydrogen.

Off. Prep. of the Peel:—

Infusum Aurantii. Infusion of Orange Peel. [Not officinal in U. S. P.] (Dried orange peel, half an ounce; boiling distilled water, ten fluid ounces.)

Syrupus Aurantii. Syrup of Orange Peel. (Tincture of Orange Peel, one fluid ounce; syrup, seven fluid ounces.)

Tinctura Aurantii. Tincture of Orange Peel. [Not officinal in U. S. P.] (Bitter orange peel, cut small and bruised, two ounces; proof spirit, one pint. Prepared by maceration and percolation.)

Of the Orange Flower Water:—

Syrupus Aurantii Floris. Syrup of Orange Flower Water. (Orange flower water, eight fluid ounces; refined sugar, three pounds; distilled water, sixteen fluid ounces, or a sufficiency to make the product four pounds and a half. The sp. gr. should be 1·33.)

Orange peel is contained in some other officinal preparations.

Therapeutics. The rind is an aromatic, bitter stomachic, a pleasant adjunct to other bitters in the treatment of dyspepsia; it covers, to some extent, the taste of quinine. Aqua Floris Aurantii, and Syrupus Floris Aurantii, are only used as vehicles, and to give flavour to other medicines.

Dose. Of infusum aurantii, 1 oz. to 2 oz.: of tinctura aurantii, 1 fl. drm. to 2 fl. drm.; of syrupus aurantii, 1 fl. drm. to 2 fl. drm.; of aqua floris aurantii, 1 fl. oz. to 2 fl. oz.; of syrupus floris aurantii, 1 fl. drm. to 2 fl. drm.

Adulteration. Orange flower water may contain lead, derived from the vessels in which it is imported; this can be detected by passing sulphuretted hydrogen through it; when free from metallic *impurity*, it is not discoloured.

Limonis Cortex. Lemon Peel. The fresh outer part of the rind of the fruit [The rind of the fruit. U. S.] of Citrus Limonum, the Lemon tree; Lin. Syst.. Polyadelphia polyandria: a tree cultivated in Southern Europe.

Limonis Oleum. Oil of Lemons. The oil expressed or distilled from the fresh lemon peel; imported chiefly from Sicily.

Limonis Succus. Lemon Juice. The expressed juice of the ripe fruit of Citrus Limonum.

Description. The *rind*, familiar to all, should have the interior white portion removed; it occurs in thin slices of a yellow colour, dotted with numerous vesicles of oil, with a fragrant odour and aromatic, slightly bitter, taste.

The *volatile oil* is usually obtained by rasping the outer portion of the rind, and pressing it in hair sacks, sometimes by distillation; it is of a pale yellow colour, with the odour and taste of the peel: the purer oil is obtained by distillation.

The *juice*, made by pressing the fruit and straining, forms a slightly turbid, almost colourless mucilaginous acid liquid, possessing a sharp acid taste and grateful odour.

Prop. & Comp. The rind contains the *volatile oil*, a *bitter extractive* and a little *gallic acid;* also a principle, *Hesperidine*, which crystallizes in fine white needles.

The volatile oil, *Limonis Oleum*, sp. gr. 0·85, consists of two isomeric oils (as is the case with most volatile oils). Composition (C_{20} H_{16}).

The juice, *Limonis Succus*, contains *citric acid* (3 HO, C_{12} H_5 O_{11}), described under acids, in the inorganic department, and *mucilage*, with small quantities of malic acid, and acid salts, especially those of *potash*.

Off. Prep.—Of the Peel. Syrupus Limonis. Syrup of Lemons. (Fresh lemon peel, two ounces; lemon juice, strained, twenty fluid ounces; sugar, two pounds and a quarter.) The product should weigh three pounds and a half, and should have the sp. gr. 1·34.

Tinctura Limonis. Tincture of Lemon Peel. [Not officinal in U. S. P.] (Fresh lemon peel, sliced thin, two ounces and a half; proof spirit, one pint. Prepared by maceration and percolation.)

Oil of lemons is contained in Spiritus Ammoniæ Aromaticus.

Of the Juice. Syrupus Limonis. Syrup of Lemons. (Fresh lemon peel, two ounces; lemon juice, strained, one pint; refined sugar, two pounds and a quarter. The product should weigh three pounds and a half, and should have the sp. gr. 1·34.)

Therapeutics. The peel is an aromatic stomachic; the volatile oil a stimulant and carminative when given internally, and stimulant and rubefacient externally applied; the juice is refrigerant, resembling a solution of citric acid, and may be used for making effervescing draughts, in lieu of that acid. It possesses some powers besides, which render it antiscorbutic, which citric acid certainly is not; the author attributes this power to the potash salts contained in it. The juice has been proposed as a remedy in rheumatism.

Dose. Of the syrup, 1 fl. drm. to 2 fl. drm. or more; of the tincture, 1 fl. drm. to 2 fl. drm.; of the oil, 1 min. to 5 min.; of the juice, 1 fl. drm. to 4 fl. drm. or more.

Adulteration. Oil of lemons is liable to admixture with oil of turpentine, difficult to detect except when in large quantities. Lemon juice is frequently mixed with lime juice, which has the same properties; and that used in the navy has a tenth part of brandy added to it to prevent decomposition. A mixture of sugar and water, acidulated with sulphuric acid, has often been substituted for lemon juice.

Bela. Bael. The half ripe fruit, dried, of Ægle Marmalos. [Not officinal in U. S. P.]

Description. A round fruit about the size of a large orange, with a hard rind of a woody consistence. It is usually met with in dried slices or fragments, consisting of the rind, with some adherent dried pulp and seeds; the rind is about a line and a half thick, externally covered with a smooth greyish epidermis, and internally brownish orange or red. The moistened pulp is mucilaginous.

Prop. & Comp. The chemical composition of bael has not been accurately determined; it contains some astringent principle, probably more or less allied to tannic acid.

Off. Prep. Extractum Belæ Liquidum. Liquid Extract of Bael. (Made by exhausting one pound of bael by repeated macerations in water, evaporating the solution to fourteen fluid ounces, and then adding two fluid ounces of rectified spirit.)

Each fluid ounce of the extract represents one ounce of bael.

Therapeutics. Indian bael has obtained much reputation in

India in the treatment of diarrhœa and dysentery. From the author's limited experience of its powers in diarrhœa, he is not disposed to consider it superior to some other vegetable astringents. The fruit, when ripe, yields a pulp which can be made into jelly, and acts as a mild aperient.

Dose. Of extractum belæ liquidum, 1 fl. drm. to ½ fl. oz.

GUTTIFERÆ.

Cambogia. Gamboge. The gum resin from undetermined species of Garcinia, imported from Siam. The Ceylon variety is derived from Hebradendron gambogioides. [Gambogia. Gamboge. The concrete juice of an undetermined tree. U. S.]

Description. The Siam gamboge occurs in pipes or cylinders, externally streaked, from the impression of the bamboo reeds, in which the juice is collected; the pipes are from ½ inch to 1½ inch or more in diameter. Gamboge is hard, brittle, breaking with a vitreous fracture, of a bright yellow colour: inferior varieties, in fragments and masses, also come from Siam; and a coarse kind is made at Ceylon.

Prop. & Comp. No odour, taste slight at first, afterwards acrid, easily powdered. It consists of about 70 per cent. of resin, *gambogic acid* (C_{40} H_{23} O_8), with gum, &c.; when good, there is no starch; rubbed with water, the gum dissolves, the remainder is the suspended resin, forming a yellow emulsion. The resin dissolves in alcohol, but is again precipitated by water.

Off. Prep. Pilula Cambogiæ Composita. Compound Gamboge Pill. [Not officinal in U. S. P.] (Gamboge, one ounce; Barbadoes aloes, one ounce; aromatic powder, one ounce; hard soap, in powder, two ounces; syrup, a sufficiency.)

Therapeutics. Gamboge acts as a drastic and hydragogue purgative, often causing vomiting. It is seldom given alone, but combined with cream of tartar or calomel, it may be used in dropsies; and with aloes and aromatics, as an ordinary brisk purgative; sometimes as a vermifuge.

Dose. Of the powder, 1 gr. to 5 gr.; of pil. gambogiæ c., 5 gr. to 15 gr.

Adulterations. An emulsion made with boiling water does not become green on the addition of iodine, showing the absence of starch, with which it is sometimes adulterated.

CANELLACEÆ.

Canella. Canella. (Not officinal.) [Officinal in U. S. P.] The bark of Canella alba or Laurel-leaved Canella; Lin. Syst., Dodecandria monogynia: growing in the West Indies.

Description. The bark occurs in large quills or flattened pieces about an inch or so in diameter, and of varying length; externally, of a pinkish white colour; internally, very white: it breaks with a starchy fracture.

Prop. & Comp. Odour, spicy; taste, warm and bitter. It contains a *resin*, a little *volatile oil*, and *bitter extractive*, besides starch and *mannite* sugar; no tannic, gallic, or sulphuric acids are present.

Prep. In the United States Pharmacopœia, a compound powder of aloes and canella was contained under the old name of *Hiera Picra.* [Pulvis Aloe et Canellæ. Powder of aloes and canella. U. S. Aloes, three ounces; canella, twelve ounces.]

Therapeutics. An aromatic bitter stomachic and tonic; it may be given in cases of atonic dyspepsia.

Dose. Of the powder, 15 gr. to 30 gr. [Of the powder of aloes and canella, from 10 to 20 grs.]

Adulteration. Canella is not itself adulterated, but has been substituted for Winter's bark: for the distinguishing characters, see Winter's bark.

VITACEÆ.

Uvæ. Raisins. The ripe fruit of Vitis vinifera, or the Grape Vine, dried in the sun or with artificial heat; Lin. Syst., Pentandria monogynia. [Uva passa. The dried fruit of Vitis vinifera. U. S.] Probably a native of Persia, cultivated extensively in different parts of Europe. Imported from Spain.

Prop. & Comp. Raisins contain a considerable amount of *grape sugar* (C_{12} H_{14} O_{14}), and *bitartrate of potash;* it is from the

grape that tartaric acid is derived, being obtained from argol, the deposit on the sides of wine-casks.

Off. Prep. Raisins are contained in tinct. cardamomi C., and tinct. sennæ.

Therapeutics. Slightly refrigerant, but never used in medicine for any therapeutic property they possess. Used only to sweeten preparations.

Vinum Xericum. Sherry. Sherry is described under the head of Alcoholic preparations.

ZYGOPHYLLACEÆ.

Guaiaci Lignum. Guaiacum, or Guaiac Wood. Lignum Vitæ. The Wood of Guaiacum Officinale, the Officinal Guaiacum Tree; a native of St. Domingo and Jamaica; in the form of shavings or raspings.

Guaiacum. [Guaiaci Resina. U. S.] Guaiacum Resin. A resin obtained from the stem of Guaiacum officinale by natural exudation from incisions, or by heat.

Description. Guaiacum *wood* is met with in large logs, and known by the name of *Lignum Vitæ*, generally denuded of bark, and consisting of the duramen or heart-wood, of a dark greenish-brown colour, and the alburnum of a yellow tint; it is very hard, tough, and heavy; sp. gr. 1·33; the heart-wood contains a large amount of the guaiacum resin, which is dark brown, transparent, in very thin layers, brittle, of aromatic odour, and leaving, when tasted, a peculiar burning sensation in the throat; the tears are oval, of varying size, and often covered with a greenish powder on the surface. The *resin* is usually procured by boring a longitudinal hole in the log, and putting one end of it into the fire; the resin melts and exudes at the other end, where it is collected. That obtained by natural exudation is in the form of tears of varying size. The *wood* is commonly sold in chips or raspings for medicinal purposes; these when boiled in salt water yield the resin, which rises to the surface.

Prop. & Comp. The most important constituent of the wood is the above-described *resin*, which has a sp. gr. 1·29, is insoluble

in water, or yields to that fluid only some extractive matter mixed with it; a solution in rectified spirit strikes a clear blue colour when applied to the inner surface of a paring of raw potatoe, due to the action of guaiacic acid on the gluten; soluble in alcohol and ether, also in alkaline solutions; precipitated from alcohol by water, and from alkalies by acids; acted on by nitric acid and chlorine, when the colour is first shaded green, then blue, at last brown. The resin contains *guaiacic acid*, which has the composition (HO, C_{12} H_7 O_3), and has been obtained in crystalline needles, and another resinous acid the composition of which is not well known.

Off. Prep.—Of the Resin.

Mistura Guaiaci. Mixture of Guaiacum. [Not officinal in U. S. P.] (Powdered guaiacum, half an ounce; sugar, half an ounce; gum-arabic, powdered, a quarter of an ounce; cinnamon water, one pint.)

[Tinctura Guaiaci. Tincture of Guaiac, U. S. Two pints of tincture are obtained by percolation through six ounces of Guaiac.]

Tinctura Guaiaci Ammoniata. Ammoniated Tincture of Guaiacum. (Guaiac resin in fine powder, four ounces; aromatic spirits of ammonia, one pint.)

[Guaiac, in moderately coarse powder, six troy ounces; aromatic spirits of ammonia, two pints; macerate for seven days and filter. U. S.]

Guaiacum resin also enters into the composition of pilula calomelanos composita.

Guaiacum *wood* forms an ingredient of decoctum sarsæ compositum.

Therapeutics. Guaiacum, either in the form of wood or resin, when taken internally, is apt to cause heat in the throat, irritation of the intestinal canal, and, in large doses, purging. When absorbed it acts as a stimulant, diaphoretic and alterative, and is by some considered to be an emmenagogue. It is employed in chronic forms of rheumatism, especially that variety called cold rheumatism, in which the symptoms are relieved by warmth; also in periosteal affections connected with a syphilitic taint, and other chronic affections, as gout, skin diseases, and dysmenorrhœa.

Dose. Of guaiac resin, 10 gr. to 30 gr.; of mistura guaiaci,

1 fl. oz. to 1½ fl. oz.; of tinctura guaiaci ammoniata, ½ fl. drm. to 1 fl. drm.; of tinctura guaiaci 1 fl. drm. to 2 fl. drm.

Adulteration. Other resins, as that from the coniferous trees, detected by the terebinthinate odour, and solubility in oil of turpentine. A simple tincture of guaiacum, when thrown into water, becomes milky, from the precipitation of the resin: if a solution of potash is now carefully added, it is cleared, and remains so after excess of the alkali, provided guaiacum only be present, but not if other resins are contained in the tincture. The presence of guaiacum resin can be shown by the potatoe test given above.

RUTACEÆ.

Ruta. Rue. The leaf of Ruta graveolens, or Common Rue; Lin. Syst., Decandria monogynia: a plant growing throughout Europe. (Not officinal.)

Rutæ Oleum. English. Oil of Rue. Distilled from the fresh leaves and the unripe fruit of Ruta graveolens or common rue.

Description. The leaves are supra-decompound, the leaflets oblong and ovate, glaucous green, fleshy, and dotted. The oil is of a greenish-yellow colour, sp. gr. about 0·837.

Prop. & Comp. The leaves owe their properties chiefly to the *volatile oil*, which has a strong, disagreeable odour, and acid taste; becomes brown by keeping. The composition of this oil appears to be complex; it is stated to consist chiefly of euodic aldehyde (C_{22} H_{22} O_2), mixed with a small amount of lauric aldehyde (C_{24} H_{24} O_2), and a hydrocarbon isomeric with oil of turpentine and barneol. Rue leaves contain, besides this oil, a *bitter extractive* matter, soluble in water.

Therapeutics. Rue, or its oil, acts as a powerful topical stimulant, and has been used in flatulent colic; it also appears to be an antispasdomic and emmenagogue, and seems useful in hysterical affections, and in epilepsy; by some it has been thought anthelmintic. Externally, rue may be used as a rubefacient. Sometimes employed in the form of enema.

Dose. Of the powdered leaves, 20 gr. to 40 gr.; of oleum rutæ, 2 min. to 6 min.

Bucco. Buchu. [Buchu. Buchu. The leaves of Barosma crenata and other species of Barosma. U. S.] The leaves of Barosma betulina, Barosma crenulata, and Barosma serratifolia; imported from the Cape of Good Hope.

Description. The leaves of all three species are smooth, and marked with pellucid dots (oil glands) at the indentations and apex, and possess a powerful odour and camphoraceous taste.

The leaf of *Barosma betulina* is about three quarters of an inch long, coriaceous, obovate, with a recurved truncated apex, and sharp cartilaginous spreading teeth.

The leaf of *Barosma crenulata*, about an inch long; oval-lanceolate, obtuse, minutely crenated, five-nerved.

The leaf of *Barosma serratifolia*, from an inch to an inch and a half long, linear-lanceolate, tapering at each end, sharply and finely serrated, three-nerved.

Prop. & Comp. Buchu contains a *volatile oil*, which gives the odour to the leaves, and a *bitter extractive* matter, soluble in water.

Off. Prep. Infusum Bucco. Infusion of Buchu. (Buchu leaves, half an ounce; boiling distilled water, ten fluid ounces.) [Buchu, a troy ounce; boiling water, a pint. U. S.]

Tinctura Bucco. Tincture of Buchu. [Not officinal in U. S. P.] (Buchu, bruised, two ounces and a half; proof spirit, one pint. Prepared by maceration and percolation.)

[Extractum Buchu Fluidum. Fluid Extract of Buchu. U. S. Sixteen fluid ounces of fluid extract are prepared by percolation with alcohol and evaporation from sixteen troy ounces of powdered Buchu leaves.]

Therapeutics. Buchu seems to be a slight tonic and stomachic, but is used chiefly on account of its action on the urinary organs, in chronic catarrh of the bladder, and irritable condition of these parts; it acts, also, as a diuretic, and occasionally as a diaphoretic.

Dose. Of the powder, 20 gr. to 40 gr.; of infusum buchu, 1 fl. oz. to 2 fl. oz.; of the tincture, 1 fl. drm. to 2 fl. drm. [of the fluid extract, 1 fl. drm.].

Cusparia. Cusparia Bark. [Angustura. U. S.] The bark of

Galipea Cusparia, Angustura bark tree; from tropical South America.

Description. In curved pieces, or quills, several inches in length, about an inch or rather more in breadth, and one-eighth of an inch thick; the edges are feathered. Externally it is covered with a yellowish grey, uneven epidermis; internally, light brown, and separable into thin layers. It breaks with a resinous fracture; has a rather peculiar odour, and a very bitter, but aromatic taste; the cut surface, examined with a lens, usually exhibits numerous white points or minute lines.

Prop. & Comp. Cusparia bark contains a trace of *volatile oil*, some *resin*, and a principle, *cusparine*, in tetrahedral crystals, soluble in alcohol, acids, and alkalies; composition unknown. The infusion of cusparia is precipitated by tannin, so also is cusparine.

Off. Prep. Infusum Cusparie. Infusion of Cusparia. (Cusparia bark, in coarse powder, half an ounce; distilled water at 120°, ten fluid ounces.)

Therapeutics. An aromatic stomachic, and probably has antiperiodic properties. Used in atonic dyspepsia, diarrhœa, and dysentery, also in convalescence from acute diseases. In South America it has been much employed in the treatment of low malignant fevers, occurring in marshy districts; it is not much prescribed in England, nor have its powers been fully investigated.

Dose. Of the powdered bark, 10 gr. to 40 gr.; of infusum cuspariæ, 1 fl. oz. to 2 fl. oz.

Adulteration. The bark of strychnos nux vomica has been substituted for true cusparia or angustura bark, and hence named false angustura bark; as this substitution has been the cause of fatal accidents, the knowledge of the distinction between the two becomes important. The false bark is usually in shorter pieces, more irregularly twisted, with little or no odour, and much more bitter than the true bark; it breaks with a shorter and more resinous fracture, and is not separable into layers; the epidermis is whitish but spotted red; nitric acid turns the inner surface blood-red, the epidermis greenish or black; true cusparia is, however, not reddened by nitric acid, when applied to the inner sur-

face. False cusparia bark yields *brucia* and *strychnia;* the true bark contains neither of these alkaloids.

SIMARUBACEÆ.

Quassia. Quassia. The wood of Picræna excelsa: [Simaruba excelsa. U. S.] Lin. Syst., Polygamia monœcia; from Jamaica. This forms Jamaica quassia. The wood of Quassia amara was formerly imported as Surinam quassia, but is not met with at present in English commerce.

Description. Quassia occurs in cylindrical logs or billets of varying size, seldom thicker than the thigh; externally greyish brown, internally light yellow. The wood is tough, dense, without odour, but intensely bitter; it is generally sold in chips or raspings.

Prop. & Comp. Quassia yields its bitterness to water and spirit; it contains a crystallizable neutral principle, *quassine* (C_{20} H_{12} O_6), which possesses the bitterness of the wood; it is devoid of tannin or gallic acid.

Off. Prep. Extractum Quassiæ. Extract of Quassia. (Prepared by the maceration of wood in water, percolation, and evaporation to proper consistence.)

Infusum Quassiæ. Infusion of Quassia. (Quassia in chips, sixty grains; cold distilled water, ten fluid ounces.) [Tinctura Quassiæ. U. S. Tincture of Quassia. Two pints of tincture are obtained by percolating two troy ounces of Quassia in moderately fine powder with diluted alcohol.]

Therapeutics. Quassia acts as a pure bitter stomachic, devoid of astringency: used in atonic indigestion, such as occurs in gout, from alcoholic abuse and other causes. It is sometimes given as a tonic after acute diseases, and has been employed as an antiperiodic in fevers. It probably acts on the nervous system in large doses.

Dose. Of the powder, 10 gr. to 20 gr.; of the extract, 2 gr. to five gr.; of infusum quassiæ, 1 fl. oz. to 2 fl. oz; [of the tincture 2 fl. drm. to 4 fl. drm.]

Simaruba. (Not officinal.) The bark of the root of Simaruba amara, or the Mountain Damson; Lin. Syst., Diœcia decandria: a plant growing in the West Indies.

Description. It occurs in tough fibrous pieces, several feet in length, and folded; pale in colour, epidermis darker and rough: of a very bitter taste.

Prop. & Comp. Resembles quassia in containing *quassine:* it also contains a little gallic acid and much mucilage.

Therapeutics. It may be used in the same cases as quassia: it gained at one time some repute in the treatment of diarrhœa and dysentery.

Dose. Of the powder, 15 gr. to 30 gr.; it may also be given in the form of an infusion.

Cedron. (Not officinal.)

The seeds of Simaba Cedron, a plant belonging to this order, have been used as a medicine in France. They are concavo-convex in shape, about 1 inch long, $\frac{3}{4}$ inch broad, and $\frac{1}{2}$ inch thick; of a light yellowish colour; having an intense bitter taste, possibly due to *quassine.* The seeds have been supposed to be an antidote to the poison of serpents: probably they would be found to possess very useful tonic and stomachic properties in cases similar to those in which quassia and simaruba are administered.

Sub-Class II. Calycifloræ.

RHAMNACEÆ.

Rhamni Succus. (Not officinal.) Buckthorn Juice. The juice of the fruit of Rhamnus catharticus; Lin. Syst., Pentandria monogynia; indigenous.

Description. The berries, the juice of which was formerly officinal, are, when ripe, about the size of a pea, black, smooth, and containing four seeds, and a green, juicy parenchyma; the odour of the rhamnus is somewhat nauseous.

Prop. & Comp. The juice has the same odour and is of the same colour as the parenchyma; it becomes of a bright green colour on the addition of lime-water or an alkali; evaporated to dryness with lime-water it forms sap green. It contains sugar, mucilage, and a crystallizable principle called *rhamnine,* also a principle possessing purgative properties; but it is not certain whether this is identical with the aforesaid Rhamnine.

Prep. Syrupus Rhamni. Syrup of Buckthorn. (In London Pharmacopœia, 1851.) (Juice of buckthorn, four pints; ginger, sliced, pimento bruised, each, six drachms; sugar, six pounds; rectified spirit, six fluid ounces. Set aside the juice for three days that the dregs may subside, and strain. To a pint of the strained juice add the ginger and pimento, then macerate with a gentle heat for four hours, and strain; boil down the rest of the juice to a pint and a half. Mix the liquors and dissolve the sugar in them; lastly, mix in the spirit.)

Therapeutics. Buckthorn acts as a brisk hydragogue purgative, but its operation is often attended with griping and nausea; formerly it was much employed in dropsical affections, gout and rheumatism, but its use is now almost abandoned, except in the form of the syrup, which is sometimes given to children; it is however more frequently prescribed as a domestic remedy than by the medical practitioner.

Dose. Of syrupus rhamni, ½ fl. oz. to 1 fl. oz.; for a young child ½ fl. drm. to 1 fl. drm. or 2 fl. drm.

TEREBINTHACEÆ.

Terebinthina Chia. Chian Turpentine. (Not officinal.) An oleo-resin flowing from the incised trunk of the Pistacia terebinthus; Lin. Syst., Diœcia pentandria. The tree from which this oleo-resin is obtained grows chiefly in the island of Chios.

Description. This substance is about the consistence of honey, and is semi-transparent, of a white or pale yellow colour, having a fragrant odour and warm taste.

Prop. & Comp. It consists of resin dissolved in a volatile oil resembling that of turpentine.

Therapeutics. Its action is the same as that of the other turpentines; *vide* Terebinthina Americana.

Mastiche. Mastich. A resinous exudation flowing from the stem of Pistacia Lentiscus, native of the countries bordering on the Mediterranean; chiefly imported from Turkey and the Levant.

Description. In its best condition it occurs in small masses called tears, which are of light yellow colour, friable, becoming soft and ductile when chewed; the fracture vitreous, shining, and transparent; the surface of the tears is often covered with a whitish dust, produced by the rubbing together of several pieces. The larger masses are less pure than the small; they are formed by the agglutination of several tears, and often mixed with bark and earthy matter. It has a faint agreeable odour.

Prop. & Comp. It is wholly soluble in ether and chloroform but scarcely at all so in the fixed oils; it contains a small quantity of volatile oil; alcohol dissolves about four-fifths of it, and the remainder, which is soluble in ether, has been called *Masticine* (C_{40} H_{31} O_2).

Therapeutics. The action is the same as that of the resin of turpentine; it is but little used. From its agreeable odour, which it communicates to the breath, it is sometimes employed as a masticatory. Dissolved in chloroform or ether, it is often used for stopping carious teeth.

Dose. 20 gr. to 40 gr.

Myrrha. Myrrh. A gum-resin exuding from the bark of Balsamodendron Myrrha; Lin. Syst., Octandria monogynia. It is obtained from Arabia Felix and Abissinia.

Description. It occurs in irregular fragments, varying in size; of a reddish-brown or reddish-yellow colour; translucent, but the surface often covered with powder; fractured surface irregular and somewhat oily; of a peculiar aromatic odour, and pungent warm acrid bitter taste. The inferior variety is in much larger masses than the pure, darker coloured, less transparent, and containing earthy and other impurities. The latter variety is also known as Indian myrrh, from its being imported into England from that country. The best of Turkey myrrh comes by way of Egypt and the Levant.

Prop. & Comp. It contains a *volatile oil*, *gum*, *resin*, salts, &c. The resin is bitter, soluble in alcohol, but partly only in ether. With water, myrrh forms an emulsion of a milky-white colour, from the suspension of the resin by the gum which is held in solution.

Off. Prep. Pilula Aloes et Myrrhæ. Pill of Aloes and Myrrh. (Socotrine aloes, two ounces; myrrh, one ounce; saffron, dried, half an ounce; confection of roses, two ounces and a half.) [In the U. S. P. syrup a sufficient quantity is directed instead of confection of roses, and the mass is divided into four hundred and eighty pills, each pill containing two grains of aloes.]

Tinctura Myrrhæ. Tincture of Myrrh. (Myrrh in coarse powder, two ounces and a half; rectified spirit, twenty fluid ounces. Prepared by maceration and percolation.) [According to the U. S. P. two pints of tincture are prepared by percolation with alcohol from three troy ounces of myrrh.]

Myrrh is also contained in Mist. Ferri C.; Pil. Assafœtidæ C.; Pil. Rhei C.; and Decoct. Aloes C.

Therapeutics. Myrrh acts as a stimulant in a manner not unlike other resinous substances; it increases the secretion of the mucous membranes, especially of the bronchial tubes, and is supposed to possess antispasmodic and emmenagogue properties, combined with tonic powers.

Myrrh is frequently administered in conjunction with iron and aloetic preparations in amenorrhœa; also in leucorrheal and other mucous discharges connected with debility: sometimes as an expectorant in chronic bronchitis and phthisis. Externally, as a topical stimulant, it is applied to aphthous sore mouths, spongy gums, &c.

Dose. Of myrrh, 10 gr. to 30 gr.; of tinct. myrrhæ, ½ fl. drm. to 1 fl. drm. Of pil. aloes c. myrrhâ, 5 gr. to 15 gr. The tincture is more frequently used externally, mixed with water (2 fl. drm. to 4 fl. oz.), to form a gargle.

Adulteration. Gum bdellium and other gum resins are occasionally met with in samples of myrrh, and an inferior kind is often substituted for good myrrh.

Rhus Toxicodendron. The leaves of the Rhus Toxicodendron (the poison sumach); Lin. Syst., Pentandria trigynia: not now officinal in the British, but is contained in the United States' Pharmacopœia.

Description. The leaves are trifoliate, leaflets entire, or rarely toothed; ovate, deep shining green on the upper surface, hairy on the under.

Prop. & Comp. The leaves contain a peculiar *acrid resin*, and gummy extractive. It is on the presence of the former substance that the properties of the plant depend.

Prep. For topical application a tincture of the leaves is made.

Therapeutics. It is chiefly used as a topical irritant. The juice of the leaves causes inflammation and vesication of the part to which it is applied. Internally administered, it is supposed to act on the spinal system in a manner similar to strychnia; in large doses it causes inflammation, &c., of the stomach. It has been recommended in palsy, but further investigations as to its efficacy are required.

Dose. Of the powder, ½ gr. to 1 gr., gradually increased.

Olibanum. Gum resin from the Boswellia serrata; Lin. Syst., Decandria monogynia. This resin is not officinal.

Description. It occurs in small oblong tears, of a peculiar balsamic odour.

Prop. & Comp. It burns with an aromatic odour, and contains a *volatile oil*, *resin*, and gum.

Therapeutics. It is stimulant, like the other gum resins, but is chiefly used for burning as an incense in Roman Catholic countries.

Elemi. Elemi. A concrete resinous exudation from an uncertain plant, probably Canarium Commune. Chiefly imported from Manilla. [Not officinal in U. S. P.]

Description. It occurs in masses of various sizes, usually of a soft consistence, more or less transparent, of a yellowish colour, with a peculiar fennel-like odour, and a bitter aromatic taste.

Prop. & Comp. The odour is due to the presence of *volatile oil;* the *resin* is soluble in alcohol.

Off. Prep. Unguentum Elemi. Ointment of Elemi. (Elemi, quarter of an ounce; simple ointment, one ounce.)

Therapeutics. Action as the turpentines generally; chiefly used externally, in the form of ointment, as a topical stimulant.

Dose. Not given internally.

LEGUMINOSÆ.

Papilionaceæ.

Glycyrrhiza. Liquorice root. The recent and dried root or underground stem of Glycyrrhiza glabra; Lin. Syst., Diadelphia decandria: cultivated in England; the fresh root should be kept in dry sand.

Description. In cylindrical branched pieces, brown on the surface and yellow within, about the size of the little finger; tough and pliable; sweet and mucilaginous to the taste.

Prop. & Comp. Contains a peculiar sweet brownish substance, *glycyrrhizine* ($C_{48}H_{36}O_{18}$); not fermentable nor crystalline; soluble in water and spirit; when boiled with hydrochloric acid, it is resolved into a resinous matter and glucose. Liquorice also contains *asparagine*, gum, mucilage, &c.

Off. Prep. Extractum Glycyrrhizæ. Extract of Liquorice. (Obtained by maceration and percolation of liquorice root with water and subsequent evaporation to a proper consistence.)

Powdered liquorice root is contained in some pills, and other officinal preparations; and the extract in compound decoction of aloes and the confection of senna, &c.

Therapeutics. A sweet demulcent, useful in allaying cough, to sheathe the mucous membranes, &c., but more frequently employed on account of its sweetness to cover the taste of other medicines.

Dose. Of the extract, 10 gr. to 30 gr., rubbed up with water, &c.

Tragacantha. Tragacanth. The gummy juice (hardened in the air) exuding from the bark of Astragalus verus, the Milk Vetch, and possibly other species; Lin. Syst., Diadelphia decandria: collected in Asia Minor.

Description. In semi-transparent flakes, waved concentrically, rough, and difficult to powder, without odour or taste.

Prop. & Comp. Forms with water a very thick tenacious mucilage, and contains two distinct gums: *Arabine*, like that contained in gum Arabic, &c., about 53 per cent.; and *Bassorine*,

a gum not soluble in water, and, therefore, suspended only in the mucilage, about 47 per cent.; by the action of alkalies, it is rendered soluble in water and converted into true gum; the prolonged action of boiling water produces a similar change in the nature of bassorine. Nitric acid converts it into mucic and oxalic acids.

Off. Prep. Mucilago Tragacanthæ. Mucilage of Tragacanth. (Tragacanth, one hundred grains; boiling distilled water, ten fluid ounces.)

Pulvis Tragacanthæ Compositus. Compound Tragacanth Powder. [Not officinal in U. S. P.] (Powdered tragacanth, powdered acacia, starch, each, one ounce; refined powdered sugar, three ounces.)

Therapeutics. Simply demulcent, used as gum Arabic; the mucilage is usefully employed to suspend heavy powders, as nitrate of bismuth, &c.

Dose. Of the powder, or of pulv. tragacanthæ c., 20 gr., upwards; of the mucilage, 1 fl. oz. upwards.

Mucuna. Cowhage. (Not officinal.) [Officinal in U. S. P.] The hairs of the fruit of Mucuna pruriens, Cowhage plant; Lin. Syst., Diadelphia decandria: growing in the West Indies.

Description. The legume or pod is shaped like the italic letter *f*, about 4 inches long and ½ inch broad, coriaceous, and covered with numerous stiff, brown, stinging hairs, which have serrations near their points; these are removed, and employed in medicine.

Therapeutics. Cowhage has been used as an anthelmintic, and is supposed to act by its mechanical peculiarities, irritating the entozoa and thus causing expulsion. The watery or alcoholic solutions of mucuna do not possess the same powers.

Dose. Of an electuary of the hairs made with syrup, honey, or treacle, from a tea-spoonful to a table-spoonful, or more, followed after a short time by the administration of some purgative.

Scoparius. Broom tops. The fresh and dried tops of Sarothamnus Scoparius (Spartium Scoparium), or Common Broom; [Cytisus Scoparius. U. S.] Lin. Syst., Diadelphia decandria: indigenous, and growing throughout Europe.

Prop. & Comp. The tops, when fresh, have a peculiar odour, which is lost in drying; the taste is bitter; they contain a neutral

principle, *Scoparine* (C_{20} H_{11} O_{10}), which forms yellow crystals; also a liquid alkaloid, *Sparteine* (C_{16} H_{13} N); of a pale colour when fresh, but becoming brown on exposure; forming crystalline salts with bichloride of platinum and corrosive sublimate; besides which, extractive matters and salts are found in the tops.

Off. Prep. Decoctum Scoparii. Decoction of Broom. [Not officinal in U. S. P.] (Broom tops, dried, half an ounce; distilled water, ten fluid ounces; reduced to eight ounces by boiling.)

Succus Scoparii. Juice of Broom. [Not officinal in U. S. P.] (Expressed juice of fresh broom tops, three fluid parts; rectified spirit, one fluid part.)

Therapeutics. Broom tops have long been reputed diuretic; probably this action depends on the presence of one of the principles above noticed; the alkaline salts contained in the tops are sufficient to account for their activity, which in some cases is undoubted. Broom tops are especially useful in dropsies, depending on cardiac disease. In large doses they cause vomiting and purging.

Dose. Of decoctum scoparii, 1 fl. oz. to 3 fl. oz. Of succus scoparii, 1 fl. drm. to ½ fl. oz.

Pterocarpus. Red Sandal Wood. [Santalum. Red Saunders. U. S.] The wood of Pterocarpus santalinus, Red Saunder's Wood; Lin. Syst., Diadelphia decandria; growing in Coromandel and Ceylon.

Description. Sandal wood occurs in billets, which are dense, externally of a dark brown colour, internally, if cut transversely, hard-grained, variegated with dark and lighter red rings. The powder is blood-red, of a faint peculiar odour, with an obscurely astringent taste. The wood occurs also in chips.

Prop. & Comp. Sandal wood contains a principle called *Santalin*, crystalline and reddening in the air. The colour of the wood is extracted by alcohol and ether, and also by alkaline solutions.

Off. Prep. It gives colour to tinct. lavandulæ comp.

Uses. No therapeutic action; used only as a colouring agent.

Kino. Kino. The juice (hardened in the sun) flowing from the

incised bark of Pterocarpus marsupium, or Indian Kino Tree; Lin. Syst., Diadelphia decandria: growing near the Malabar Coast. Other varieties of Kino are met with, as African Kino, from Pterocarpus erinaceus; Botany Bay Kino, from Eucalyptus resinifera, &c.

Description. In small angular pieces, broken reddish-black tears, translucent, and ruby-red at the edges, shining, and brittle. The powder of kino is dark red, it has no odour, the taste is astringent, and when chewed it tinges the saliva blood-red.

Prop. & Comp. Kino contains a species of *tannin* called mimotannic acid, and another astringent principle, found also in catechu, called *Catechin* (HO, $C_{20}H_9O_8$), together with *red gummy matter*, &c. (See Catechu.)

Off. Prep. Pulvis Kino cum Opio. Powder of Kino and Opium. [Not officinal in U. S. P.] *Synonym.* Pulvis Kino Compositus. *Lond.* (Kino in powder, three ounces and three quarters; opium in powder, a quarter of an ounce; cinnamon in powder, one ounce.)

One grain of opium is contained in twenty grains of the powder.

Tinctura Kino. Tincture of Kino. (Powdered kino, two ounces; rectified spirit, one pint; prepared by maceration. [Kino, in fine powder, three hundred and sixty grains. Half a pint of tincture is obtained by percolation with two measures of alcohol and one of water. U. S.] If made with proof spirit, it is apt to gelatinize after a time. Kino is also contained in pulvis catechu compositus, one grain in five of the powder.

Therapeutics. A powerful astringent, may be given where tannin is indicated: it is less soluble than catechu; often employed in pyrosis and diarrhœa, and as a gargle in relaxed throat. Sometimes it is chewed, and the soluble portion is thus brought into contact with the relaxed parts.

Dose. Of powdered kino, 10 gr. to 30 gr. or more; of pulvis kino cum opio, 5 gr. upwards, the dose depending more on the opium than the kino. Of tinctura kino, ½ fl. drm. to 2 fl. drm.

Balsamum Peruvianum. Peru Balsam. The balsam flowing from the incised trunk of Myrospermum Pereiræ [The prepared

juice of Myrospermum Peruiferum. U. S.]; obtained from Salvador in Guatemala.

Description. A thick, viscid, almost opaque, substance, like treacle, but when in thin layers, dark red in colour, and translucent; of a fragrant peculiar odour, with an acrid but aromatic taste.

Prop. & Comp. Peru Balsam is of sp. gr. 1·15; is soluble in five parts of rectified spirit, and undergoes no diminution in volume when mixed with water. It contains styracine or metacinnamene ($C_{36}\ H_{16}\ O_4$), a crystallizable solid, which is decomposed by alkali into *cinnamic acid* ($HO,\ C_{18}\ H_7\ O_3$), and *Styrone* or *Peruvine* ($HO,\ C_{18}\ H_9\ O_4$). Balsam of Peru also contains two resins, hydrates of styracine, their formulæ being ($HO,\ C_{36}\ H_{16}\ O_6$) and ($4\ HO,\ C_{36}\ H_{16}\ O_6$). The decomposition of the styracine by the action of potash may be thus represented:—

$$\underset{\text{Styracine.}}{(C_{36}\ H_{16}\ O_4)} + \underset{\text{Potash.}}{(HO,\ KO)} = \underset{\text{Cinnamate of Potash.}}{(KO,\ C_{18}\ H_7\ O_3)} + \underset{\text{Styrone.}}{(HO,\ C_{18}\ H_9\ O.)}$$

Styrone being a species of alcohol termed cinnamic alcohol. The amount of resin increases with age, and about six or seven per cent. of cinnamic acid is always present; this was formerly thought to be benzoic acid.

Therapeutics. A stimulant and expectorant, chiefly used in chronic bronchitis and rheumatism. It acts also on the mucous membranes, and may be used to restrain excessive discharges, as gleets, leucorrhœa, &c. Externally, it also acts as a stimulant; useful in bed sores and unhealthy ulcers.

Dose. 10 min. to ½ fl. drm., and upwards, made into an emulsion with mucilage, or yolk of egg.

Balsamum Tolutanum. Tolu Balsam. The balsam (indurated) flowing from the incised trunk of Myrospermum toluiferum, or Balsam of Tolu Tree; Lin. Syst., Decandria monogynia: growing in Central America, Carthagena, mountains of Tolu, &c.

Description. A reddish-yellow substance, not unlike resin; soft when first imported, becoming hard by age; more or less transparent. Odour and taste the same as balsam of Peru, but less powerful.

Prop. & Comp. Softens by heat, becomes brittle in the cold; is soluble in alcohol, ether, and in rectified spirit; yields cinnamic acid to water; it is similar in preparation to balsam of Peru, containing styracine or *meta-cinnamene*, *cinnamic acid* and *resin*.

Off. Prep. Syrupus Tolutanus. Syrup of Tolu. (Balsam of Tolu, one ounce and a quarter; distilled water, one pint, or a sufficiency; sugar, two pounds. Boil the balsam in the water for half an hour in a covered vessel, frequently stirring, remove from the fire and add distilled water, so that the liquid shall measure sixteen ounces, and strain the liquor when cold; then add the sugar, and dissolve it). The product should weigh three pounds, and should have the specific gravity of 1·33. [Tincture of Tolu, two fluid ounces; carbonate of magnesia, one hundred and twenty grains; sugar, in coarse powder, twenty-six troy ounces; water, a pint. Rub the tincture of Tolu first with the carbonate of magnesia and two troy ounces of the sugar, then with the water, gradually added, and filter. To the filtered liquid, add the remainder of the sugar, and having dissolved it with the aid of a gentle heat, strain while hot. U. S.]

Tinctura Tolutana. Tincture of Tolu. (Balsam of Tolu, two ounces and a half; rectified spirit, one pint. Prepared by maceration.) [Balsam of Tolu, three troy ounces; alcohol, two pints. U. S.]

Balsam of Tolu is contained also in tinct. benzoini comp.

Therapeutics. Exactly the same as the balsam of Peru.

Dose. Of the balsam, 10 gr. to 30 gr.; of the syrup, 1 fl. drm. to 3 fl. drm.; of the tincture, ½ fl. drm. to 1 fl. drm.

Calabar Bean. (Not officinal.) The seed or bean of Physostigma venenosum.

Description. The beans have a shining integument of a brown coffee colour, about an inch in length, and half an inch in thickness, reniform in shape, with a shorter or concave and a longer or convex margin, and on the convex edge is a furrow with elevated ridges, pierced by a foramen at one extremity. The kernel consists of two large concavo-convex cotyledons of a white colour.

Prop. & Comp. The active principle is contained to the great-

est extent in the kernel, and may be extracted by alcohol. Recently it has been stated to have been separated, but not in a crystalline form.

Therapeutics. Administered internally, it has a sedative action upon the spinal cord, producing paralysis of the lower extremities and death by asphyxia, or if in large doses death by paralysis of the heart, consciousness being retained throughout. It is almost entirely used as a topical application to the eye, to induce contraction of the pupil and diminish presbyopia. It produces at first myopia in the healthy eye, and afterwards contraction of the pupil.

Dose. Internally, from 1 gr. of the powder may be given, gradually increased; a drop or so of the solution of an alcoholic extract dissolved in water or glycerine may be applied to the eye to cause contraction of the pupil.

Cisalpinæ.

Hæmatoxylum. Logwood. The wood of Hæmatoxylum campechianum; Lin. Syst., Decandria monogynia: a native of Campeachy; grows in the West India Islands and in India.

Description. It occurs in billets, consisting of the heartwood only, which is heavier than water, of a dark red colour; little odour, but of a very astringent taste. It is cut into chips, which have a feeble agreeable odour, and a sweetish taste; a small portion chewed imparts to the saliva a dark pink colour.

Prop. & Comp. Water and alcohol dissolve the colouring and astringent principles: the solutions are deepened in colour by alkalies, and rendered rather turbid by acids. It contains *hæmatoxyline* ($C_{32}H_{14}O_{12}+2$ HO or 6 HO) crystallizing in reddish yellow four-sided needles, with six equivalents of water, or granular crystals with two equivalents; soluble in alcohol and ether, but sparingly so in water. There are also present *tannin*, *resin*, and the ordinary constituents of wood. Hæmatoxyline is occasionally found crystallized in the crevices of the wood.

Off. Prep. Decoctum Hæmatoxyli. Decoction of Logwood. (Logwood in chips, one ounce; cinnamon in powder, sixty grains; distilled water, one pint. Reduced by boiling to sixteen fluid ounces.) [Logwood rasped, a troy ounce; boil with a pint of water for fifteen minutes, strain, and add sufficient water through the strainer to make the decoction measure a pint. U. S.]

Extractum Hæmatoxyli. Extract of Logwood. (Logwood chips, one pound; boiling distilled water, one gallon. Prepared by maceration and evaporation to a proper consistence.)

Therapeutics. Logwood is chiefly employed as an astringent in affections of the alimentary canal, as diarrhœa, chronic dysentery, and some forms of atonic dyspepsia: it is often given to children. The urine of patients taking logwood exhibits a pink colour when that fluid becomes alkaline from any cause; in strongly acid urine the colour may not be seen, but the addition of ammonia readily produces the coloration.

Dose. Of decoctum hæmatoxyli, 1 fl. oz. to 2 fl. oz.; of extractum hæmatoxyli, 10 gr. to 30 gr.

Senna Alexandrina. Alexandrian Senna. The leaf of Cassia lanceolata and Cassia obovata.

Senna Indica. Tinnevelly Senna. The leaf of Cassia elongata; Lin. Syst., Decandria monogynia: growing chiefly in Southern India. [Senna, Senna. The leaflets of Cassia acutifolia of Cassia obovata and of Cassia elongata. U. S.]

Description. There has been some considerable difficulty and confusion about the plants yielding senna, arising from different plants having been called by the same name, and different names given to the same plant. Dr. Royle thinks that the species, cassia officinalis, may include the varieties, C. elongata, C. lanceolata, and C. acutifolia; besides which there are other species, cassia obovata, cassia ovata, and cassia Forskalii. The leaflets of the three varieties of senna are of a greenish colour, with a faint peculiar odour and sweetish taste; they are all *unequally* oblique at the base. The leaves of *Cassia lanceolata* are lanceolate, about an inch in length; those of *Cassia obovata*, rather shorter and obovate; those of *Elongata* (Tinnevelly) about 2 inches long, lanceolate and acute.

Alexandrian senna usually consists of leaflets of cassia *officinalis* (var. lanceolata), and of cassia *obovata*, with pods and broken leaf-stalks; together with the leaves of *cynanchum arghel*, and sometimes, but not in English commerce, with those of *colatea arborescens*, and *coriaria myrtifolia*. Alexandrian senna has been stated to have about the following proportions of ingredients:

five parts of the leaflets of cassia officinalis (var. lanceolata), three parts of cassia obovata, and two parts of cynanchum arghel. As now sold, it is usually picked and the arghel separated; it should be carefully freed from the flowers, and pods, and leaf-stalks, and from the leaves, flowers, and fruit of *solenostemna* (*Cynanchum*) *arghel.*

Cynanchum arghel leaves are distinguished by being about one inch long, equal at the base, no lateral nerves on the under surface: pale in colour, thick and coriaceous in consistence. This addition to senna is important as the arghel is supposed to gripe and nauseate.

The leaflets of *colatea arborescens*, or bladder senna, are ovate, and equal at the base; and those of *coriaria myrtifolia* have a strongly marked lateral nerve on each side of the mid-rib.

The leaflets of *tephrosia apollinea*, distinguished by having parallel transverse veins, and being silky on the under surface, have sometimes been met with in Alexandrian senna.

Indian senna may be divided into Tinnevelly senna and the ordinary East India variety: the former is by far the finest, the leaflets being large and thin, from one to two inches in length, of a greenish colour, and generally entire; unequally oblique at the base; this variety only is officinal; in the latter, the leaflets are smaller, browner in colour, and many of them broken; stalks and pods are also frequently met with. All the Indian sennas are obtained from one variety of cassia officinalis, viz., C. elongata.

Another variety of commercial senna is called *Tripoli* senna: when good, it consists chiefly of leaflets of C. *Æthiopica*, a variety of cassia *ovata*, mixed with cassia *obovata.*

Prop. & Comp. Senna has a faint odour and nauseous taste; it imparts its virtues to water, either hot or cold; also to alcohol: it contains *Cathartine*, which can only be separated as a yellowish-red deliquescent substance, not crystallizable, with a trace of volatile oil, and the ordinary constituents of leaves. The cathartine is stated by some not to be the active principle.

Off. Prep. Confectio Sennæ. Confection of Senna. (Senna, in fine powder, seven ounces; coriander, in fine powder, three ounces; figs, twelve ounces; tamarinds, nine ounces; cassia pulp, nine ounces; prunes, six ounces; extract of liquorice, three

quarters of an ounce; refined sugar, thirty ounces; distilled water, twenty-four fluid ounces.)

INFUSUM SENNÆ. Infusion of Senna. (Senna, half an ounce; ginger, sliced, thirty grains; boiling distilled water, ten fluid ounces. [Senna, a troy ounce; coriander, bruised, sixty grains; boiling water, a pint. U. S.] Macerate for an hour in a closed vessel, and strain.)

TINCTURA SENNÆ. Tincture of Senna. (Senna, broken small, two ounces and a half; raisins free from seeds, two ounces; caraway and coriander, each half an ounce; proof spirit, one pint.) [Not officinal in U. S. P.]

SYRUPUS SENNÆ. Syrup of Senna. (Senna, broken small, sixteen ounces; oil of coriander, three minims; refined sugar, twenty-four ounces; distilled water, five pints, or a sufficiency; rectified spirit, two fluid ounces. Digest the senna in seventy ounces of the water for twenty-four hours; press and strain. Digest the mass in thirty ounces of the water for six hours; press and strain. Evaporate the mixed liquors to ten fluid ounces; and when cold add the rectified spirit, previously mixed with the oil of coriander. Clarify by filtration, and wash what remains on the filter with distilled water, until the washings make up the filtrate to sixteen fluid ounces; then add the sugar, and dissolve by means of a gentle heat.) The product should weigh ten ounces, and should have the sp. gr. 1·31. [Not officinal in U. S. P.]

[Extractum Sennæ Fluidum. Fluid Extract of Senna. U. S. A pint of fluid extract is obtained from sixteen troy ounces of senna, by percolation with diluted alcohol, evaporation and the addition of eight troy ounces of sugar.]

Therapeutics. Senna is a rather brisk purgative, increasing considerably the peristaltic action, and also to some extent the liquid flow from the intestines; it appears to act chiefly on the small intestines, and less on the colon and rectum than aloes; sometimes nausea and griping are produced if the drug is given alone; it is generally combined with salines, as Epsom salts, or tartrate of potash, and some aromatic; such combination forms the "black draught." Senna is given when constipation is present in dyspepsia, and in almost all febrile and inflammatory diseases;

as it is somewhat drastic, it should not be given when the alimentary canal is much affected.

Dose. Of the powdered leaf, 30 gr. to 120 gr. (a bad form). Of the infusion, 1 fl. oz. to 2 fl. oz.; of the tincture, 1 fl. drm. to ½ fl. oz.; of the confection, from a tea-spoonful upwards; of the syrup, 1 fl. drm. upwards (generally given to infants). The present syrup is an effectual preparation.

For the *Adulterations* of Senna, see *Description*.

Cassia. Cassia Pulp. [Cassia Fistula. Purging Cassia. U. S.] The pulp of the pods of Cassia fistula; Pudding Pipe Tree, or Purging Cassia; Lin. Syst., Decandria monogynia; from the East Indies, or recently extracted from pods imported from the East or West Indies.

Description. The fruit is a cylindrical pod or legume, from 1 to 2 feet long, about the size of the thumb, having three bands extending the whole length, divided internally into numerous cells, spurious dissepiments, each containing a seed, surrounded by a blackish soft pulp, which is the part made use of in medicine. The heavier the pod, the more pulp it contains.

Prop. & Comp. The pulp has a sweetish, rather disagreeable, taste; is of a blackish brown colour, usually containing the seeds and dissepiments; and contains besides sugar, pectin, mucilage, and some principle probably similar to that found in senna.

Cassia is contained in Confectio Sennæ.

Therapeutics. A slight laxative, apt to give rise to disturbance of the bowels, producing flatulence; seldom given alone.

Dose. Of the prepared pulp, 120 gr. upwards.

Tamarindus. Tamarind. The pulp of the fruit of Tamarindus indica or Tamarind Tree; [The preserved fruit of Tamarindus Indica. U. S.] Lin. Syst., Monodelphia triandria; growing in the East and West Indies. The East Indian pod is larger than that from the West Indies: at present it chiefly comes from the West Indies.

Description. The pods are about 4 or 5 inches long, and ¾ inch broad, flattened and curved; internally divided into cells containing oval seeds, surrounded by the pulp, which is soft, of a brownish-red colour, and sweet acidulous taste and contains strong

fibres; the seeds are brown and shining, and enclosed in membranous coats.

Prop. & Comp. It contains sugar, pectin, free *citric* and *tartaric* acids, *bitartrate of potash*, &c. A piece of bright iron left in contact with the pulp for an hour, should not exhibit any deposit of copper.

Off. Prep. Tamarinds are contained in Confectio Sennæ.

Therapeutics. Tamarinds act as a very slight laxative, besides which they are refrigerant from the acids they contain, and useful, when infused, as a cooling drink, in febrile affections.

Dose. ½ oz. upwards. A whey may be made by boiling the pulp with milk.

Copaiba. Copaiva; Balsam of Copaiva. An oleo-resin flowing from the incised trunk of Copaifera multijuga and other species; the varieties of Copaiva Tree; Lin. Syst., Decandria monogynia: growing in the West Indies and tropical parts of America, and obtained chiefly from the province of Para in Brazil.

Copaibæ Oleum. Oil of Copaiva. Oil distilled from the oleo-resin.

Description. The oleo-resin is a transparent liquid, about the consistence of thick oil, of a yellow colour, characteristic odour, and slightly acrid, nauseous, terebinthinate taste. The Brazilian variety, which is chiefly met with, is much paler than the West Indian. The volatile oil is a colourless liquid, with the odour and taste of copaiva.

Prop. & Comp. Copaiva consists of about 45 per cent. of *resin*, and 34 per cent. of the *volatile oil*, but the proportions vary with age and exposure; its sp. gr. is about 0·95; the resin, copaivic acid (C_{40} H_{30} O_4), resembles closely common resin or pinic acid, and is crystalline. The volatile oil (C_{20} H_{16}), except in odour and taste, is closely allied to oil of turpentine. Besides these principles, about 1½ or 2 per cent. of a soft brown or resinous matter is contained in copaiva, the nature of which is unknown; it seems to increase in amount as the copaiva becomes old.

The oleo-resin is perfectly soluble in rectified spirit. It dissolves one-fourth of its weight of carbonate of magnesia by the aid of heat, and remains transparent.

[Pilulæ Copaibæ. Pills of Copaiba. U. S. Two troy ounces of copaiba are mixed with sixty grains of magnesia; when the mass has concreted, it is divided into two hundred pills.]

Therapeutics. Copaiva acts as a stimulant like other terebinthinate drugs; its influence is more particularly directed to the mucous membranes, especially that of the genito-urinary organs; when taken into the stomach it becomes absorbed, and can be detected both in the breath and urine by the peculiarity of its odour; from the latter fluid it may be separated by ether. It is used with much success in affections of the urethra and bladder, as gonorrhea and gleet, but may also be given advantageously in chronic bronchitis, accompanied by excessive secretion of mucus, and in diseased conditions of the mucous membrane of the rectum; it should be avoided in febrile states of the system, as it acts also as a general stimulant. In large doses it occasionally gives rise to a papular eruption on the skin. The action of the *volatile oil* resembles that of the balsam itself.

Dose. Of copaiba, 15 min. to ½ fl. drm. or more; of oleum copaibæ, 10 min. to ½ fl. drm. Copaiva may be taken rubbed up with the yolk of egg, or floating upon water or some other liquid, or made into pills with burnt magnesia; or, lastly, dissolved in water by the aid of liquor potassæ, with which it forms a soap. Sometimes to hide its disagreeable taste it is put into membranous or gelatinous capsules.

Adulteration. Turpentine and fixed oils may be mixed with copaiva: if a little of the suspected drug is heated on paper, turpentine can be detected by the odour, and all fixed oils by a greasy ring surrounding the resinous stain which pure copaiva leaves. Its power of dissolving carbonate of magnesia may be also used as a test.

Mimosæ.

Acacia. Gum Arabica. Acacia gum, exuding from the bark of one or more undetermined species of Acacia, and hardened in the air; collected chiefly in Condofan in Eastern Africa, and imported from Alexandria.

Description. Gum is usually a natural exudation from the tree, sometimes incisions are made to favour its flow; it occurs

in small rounded tears of different sizes, almost white and opaque from innumerable fissures on the surface; brittle, devoid of odour, and with a mucilaginous taste. Varieties of gum, as Senegal and Barbary gum, in larger tears, more coloured, and less pure, are found in commerce; the produce of different Acacias, as A. Senegal and A. gummifera.

Prop. & Comp. Gum is entirely soluble in water if pure, forming a mucilage; it contains usually about 17 per cent. of water, and leaves on incineration 3 per cent. of ash: the solution forms an opaque white jelly with subacetate of lead. The principal ingredient of gum, is *arabine*, (C_{12} H_{11} O_{11}.) Arabine is converted by the action of nitric acid into *mucic* acid, but is not convertible into sugar. The powder does not become blue on the addition of iodine.

Off. Prep. Mucilago Acaciæ. Mucilage of Gum Arabic. (Gum arabic, in small pieces, four ounces; distilled water, six fluid ounces.)

Gum is contained also in pulv. tragacanth. c. and other officinal preparations.

Therapeutics. Gum acts simply as a demulcent, and is sometimes employed to allay irritation of the mucous membranes, as of the fauces, pharynx, and stomach; it is, however, more frequently used for the purpose of suspending heavy powders, as nitrate of bismuth, oxide of zinc, &c., when administered in the liquid form; also to unite substances into the form of lozenges. Gum has been used also in diabetes mellitus, as a substitute for amylaceous matters, as it is not converted into sugar, but its use does not appear to be attended with any real benefit; whether it passes into the urine unchanged is not known; it is, however, often used in irritation of the bladder and urethra.

Dose. Gum may be given *ad libitum*; the author has given ½ lb. per diem in diabetes, without any perceptible symptom being produced.

Catechu Nigrum. Black Catechu. An extract from the wood of Acacia Catechu; Lin. Syst., Polygamia monœcia; imported from Pegu.

Catechu Pallidum. Pale Catechu. An extract from the leaf of Uncaria gambir; Lin. Syst., Pentandria monogynia, belonging

to the natural order Cinchonaceæ; prepared at Singapore, and in the islands of the Eastern Archipelago. [Catechu. Catechu. An extract prepared principally from the wood of Acacia Catechu. U. S.]

Description. The *dark catechu*, produced by the acacia catechu occurs in irregular-shaped masses, consisting of layers enveloped in rough leaves, hard, yet brittle; of a blackish-red colour and shining surface, with a very astringent and bitter taste, followed by an impression of sweetness. The *pale catechu* occurs in cubical pieces about an inch in diameter, which are porous in texture; externally of a reddish-brown colour, internally ochrey yellow or pale brick red; of a dull earthy fracture; bitter and astringent taste: it is the produce of Uncaria gambir. The pieces are now less irregular in shape. There are many other trees which yield catechu, as the Areca catechu, or Betel-nut, &c. In fact the extracts of the different parts of many plants possess properties not unlike the substances under consideration.

Prop. & Comp. Dark catechu is heavier than pale. The former has sp. gr. 1·45; the latter 1·39. The different varieties of catechu consist mainly of *mimotannic* acid and *catechin*. Mimotannic acid is soluble in cold water, and is distinguished from gallotannic acid by its yielding a greenish precipitate with persalts of iron; by not precipitating tartarized antimony; and by not yielding pyrogallic acid when heated; when exposed in a moist state it becomes dark red from the absorption of oxygen, and is rendered insoluble. Catechin is insoluble in cold water, but soluble in boiling water, alcohol, and ether; the solutions do not precipitate gelatine, and strike green with persalts of iron; it is converted by the action of alkalies and their carbonates into *Japonic* and *Rubinic* acids. It crystallizes in colourless needles; its composition is represented by the formula, HO, C_{20} H_9 O_8. Besides these substances, an extractive matter, mucilage, and insoluble compounds, are contained in catechu. Sir H. Davy found the following per-centage of principles in pale and dark catechu. Under the head of tannin, catechin and mimotannic acid are included.

	Tannin?	Extractine.	Mucilage.	Insoluble. Matters.
Pale Catechu .	48·5	36·5	8·0	7·0
Dark Catechu .	54·5	34·0	6·5	5·0

The pale variety is entirely soluble in boiling water. The decoction when cool is not rendered blue by iodine.

Off. Prep. Infusum Catechu. Infusion of Catechu. [Infusum Catechu Compositum. U. S.] (Powdered catechu, one hundred and sixty grains; cinnamon, bruised, thirty grains; boiling distilled water, ten fluid ounces). [Powdered catechu, half a troy ounce; powdered cinnamon, sixty grains; boiling water, a pint. U. S.]

Pulvis Catechu Compositus. Compound Powder of Catechu. [Not officinal in U. S. P.] (Catechu, four ounces; kino, rhatany, each two ounces; cinnamon and nutmeg, each one ounce.)

Tinctura Catechu. Tincture of Catechu. (Powdered catechu, two ounces and a half; cinnamon, bruised, one ounce; proof spirit, one pint. By maceration and percolation.)

Trochisci Catechu. Catechu Lozenges. [Not officinal in U. S. P.] (Pale catechu, in powder, two ounces; refined sugar, in powder, one pound; gum arabic, in powder, one ounce; tincture of capsicum, half a fluid ounce; distilled water, a sufficiency. Divide into 720 lozenges.)

Therapeutics. Catechu acts as a very powerful astringent, from the mimotannic acid and catechin contained in it. The catechin is astringent, but as it is very insoluble, its action is probably more local than that of the mimotannic acid, which probably is identical with that of ordinary tannic acid. (See Tannic and Gallic Acid.) Catechu is used chiefly in affections of the alimentary canal, as in diarrhœa, and in some forms of atonic dyspepsia, accompanied with pyrosis; it may also be employed as a remote astringent in hæmorrhages and mucous discharges. Externally it may be used in the form of ointment, but has no advantage over the ointment of gall-nuts. It may be chewed, and the juice gradually swallowed in relaxed conditions of the uvula, palate, &c., and in some forms of hoarseness.

Dose. Of the powder, 10 gr. to 30 gr. or more; of infusum catechu, 1 fl. oz. to 1½ fl. oz.; of tinct. catechu, 1 fl. drm. to 2 fl. drm.; of trochisci catechu, from one to three or more; of pulvis catechu, 15 gr. to 60 gr.

Indigo. Prepared from several species of Indigofera; Nat. Order,

Leguminosæ; is introduced into Appendix B. of the Pharmacopœia for making the following preparation:

Solution of Sulphate of Indigo.

Prep. By dissolving five grains of indigo in one fluid drachm of sulphuric acid with the aid of heat, and then diluting with ten fluid ounces of water.

Prop. & Comp. Indigo owes its fine colour to the presence of a peculiar substance, *indigotin* ($C_{16} H_5 NO_2$); it is insoluble in water, but by the action of deoxidating agents it is changed into white indigo, which contains one more atom of hydrogen than indigotin: this is soluble in water, and by exposure to the air becomes reconverted into the blue variety. The solution of sulphate of indigo contains a peculiar compound of the acid and the colouring matter, called sulph-indylic acid, formula (HO, $C_{16} H_4 NO$, 2 SO_3). This solution is used as a test for free chlorine in hydrochloric acid and liquor sodæ chlorinatæ; if free chlorine be present, the colour is destroyed.

Therapeutics. The action of indigo as a therapeutic agent requires further investigation; it has been employed in epilepsy; it colours the urine green or bluish-green. Indigo is occasionally found in the urine in disease.

ROSACEÆ.

Rosa Centifolia. Cabbage-Rose Petals. The fresh petals of Rosa centifolia, the Cabbage, Damask, or Hundred-leaved Rose; [The petals of Rosa centifolia. U. S.] Lin. Syst., Icosandria polygynia; cultivated in Europe; a native of Persia and the Caucasus. The petals should be obtained from plants cultivated in Britain.

Description. The petals, familiar to all, are ordered to be used when fresh, as they lose their odour by drying. They have a sweetish-bitter and faintly astringent taste.

Prop. & Comp. Odour fragrant, depending upon a *volatile oil;* besides this, some colouring matter, and a slight laxative principle exist in the petals, and a trace of *tannic* or *gallic acid.* The volatile oil, known under the name of Attar of Roses, is prepared in India; a very small quantity exists in the rose petals.

Off. Prep. Aqua Rosæ. Rose Water. (Fresh petals of the hundred-leaved rose, ten pounds; water, two gallons. Let a gallon distil.)

Therapeutics. Rose water is used only as an agreeable vehicle for the administration of medicines; much employed in making lotions.

Dose.. Of aqua rosæ, *ad libitum.*

Rosa Gallica. Red Rose Petals. The fresh and dried petals of the unblown flower of Rosa gallica, the Red or French Rose; [The petals of Rosa gallica. U. S.] Lin. Syst., Icosandria polygynia; grows in Austria and South of Europe; cultivated in England.

Description. The flower-buds deprived of the calyx and claws are employed in medicine; they are about the size of a nutmeg, of a purplish-red colour, with an astringent taste, and a roseate odour, developed by drying.

Prop. & Comp. The petals contain *red colouring matter*, *tannic* or *gallic acid*, and a trace of *volatile oil;* the colour is acted on by light. An infusion of the petals becomes bright red with acids, and green with alkalies.

Off. Prep. Confectio Rosæ. Confection of Roses. (Fresh red rose petals, one pound; sugar, three pounds. Pound the rose petals in a stone mortar; add the sugar, and pound them again until incorporated.) [Red Rose, in fine powder, four troy ounces; sugar, in powder, thirty troy ounces; clarified honey, six troy ounces; rose water, eight fluid ounces. Rub the rose with the rose water heated to 180°; gradually add the sugar and honey beating the whole together. U. S.]

Infusum Rosæ Acidum. Acid Infusion of Roses. [Not officinal in U. S. P.] (Red rose petals, a quarter of an ounce; dilute sulphuric acid, one fluid drachm; boiling distilled water, ten fluid ounces.) It is of a bright red colour, from the action of the sulphuric acid on the colouring matter.

Syrupus Rosæ Gallicæ. Syrup of Red Roses. (Dried red rose petals, two ounces; refined sugar, thirty ounces; boiling distilled water, one pint. The product should weigh two pounds fourteen ounces, and should have the sp. gr. 1·335.)

[The U. S. P. directs a tincture to be made by percolation with

diluted alcohol, and the syrup is made from this by the addition of water and sugar.]

Therapeutics. Red rose petals are astringent, from tannin or gallic acid; they are, however, often used on account of their colouring matter. The confection is employed as a pill basis, occasionally as a slight astringent, and is applied in aphthous conditions of the mouth in the form of a linctus. The acid infusion makes an excellent gargle, and is given internally as an astringent or as a vehicle for more powerful medicines, as Epsom salts, sulphate of quina, &c. A preparation made with honey, mel rosæ, not now officinal, is a favourite astringent application to aphthæ in children.

Dose. Of the confection, 60 gr. or more; of the acid infusion, 1 fl. oz. to 2 fl. oz.; of the syrup, 1 fl. drm. or more, if given internally.

Rosa Canina. Hips. [Not officinal in U. S. P.] The fresh fruit of Rosa canina, the Dog Rose, and other allied species; Lin. Syst., Icosandria polygynia; indigenous.

Description. The ripe fruit of indigenous plants deprived of their hairy seeds (achenes), an inch or more in length, ovate, scarlet, smooth, shining; taste sweet, subacid, pleasant.

Prop. & Comp. The pulp contains *citric* and *malic* acids, with citrates, malates, sugar, a little tannin, and a trace of volatile oil.

Off. Prep. Confectio Rosæ Caninæ. Confection of Hips. (Hips, carefully deprived of their seeds, one pound; refined sugar, two pounds. Rub the pulp, gradually adding the sugar, until thoroughly incorporated.)

Therapeutics. A slight refrigerant, also somewhat astringent. In the form of the confection it is used to form a linctus, and also as a pill basis.

Dose. Of confection, 60 gr., or more.

Tormentilla. Tormentil. The rhizome of Potentilla tormentilla; Lin. Syst., Icosandria polygynia; indigenous. (Not officinal.)

Description. The rhizome is oblong in shape, knotty, and has numerous radicles attached to it, of a dark brown colour externally, and reddish-brown within.

Prop. & Comp. Tormentilla has a very astringent taste, contains about 17 per cent. of *tannic acid*, also colouring and gummy matters, and a trace of volatile oil.

Therapeutics. A powerful astringent, given sometimes in diarrhœa; also in the form of decoction as a gargle or injection: it may be used in all cases where the use of tannin is indicated.

Dose. Of powdered tormentil, 20 gr. to 60 gr., or more; of decoction (2 oz. to the 20 fl. oz.), 1 fl. oz. to 2 fl. oz.

Cydonium. Quince Seed. The seed of Cydonia vulgaris, the common Quince; Lin. Syst., Icosandria pentagynia; grows in the South of Europe and Candia. (Not officinal.) [Officinal in U. S. P.]

Description. The seeds are ovate, pointed, convex on one side, and flattened on the other; of a brownish colour; the seed-coat contains much mucilage, which it yields to boiling water.

Prop. & Comp. The mucilage from the seeds has the properties of other mucilage, being precipitated by both acetate and diacetate of lead.

Therapeutics. A demulcent, used externally, in the form of decoction or mucilage (¼ oz. to 20 fl. oz.), to cracks in the skin, &c.

Amygdala. Jordan Almonds. The seed of Amygdalus communis (the sweet variety), the Sweet Almond Tree; Lin. Syst., Icosandria monogynia; growing in Syria, Persia, also in Northern Africa and Southern Europe. The seed, from trees, cultivated about Malaga.

Amygdalæ Oleum. Almond Oil. The oil expressed from the seeds of Amygdalus communis (both bitter and sweet varieties).

[Amygdala Dulcis. Sweet Almond. The kernel of the fruit of Amygdalus Communis, variety dulcis.

Amygdala Amara. Bitter Almond. The kernel of the fruit of Amygdalus Communis, variety amara.

Oleum Amygdalæ Amaræ. Oil of Bitter Almond. The oil obtained by distilling with water the kernels of the fruit Amygdal Communis, U. S., variety amara.

Oleum Amygdalæ Dulcis. Oil of Sweet Almond. The fixed oil obtained from the kernels of the fruit of Amygdalus Communis, variety dulcis. U. S.]

Description. The character of the *almond seed* is well known; it is above an inch in length, lanceolate, acute, with a clear cin

namon-brown seed-coat, and a bland, sweetish, nutty-flavoured kernel: the bitter almond is the smaller of the two. The *oil* is of a very pale-yellow colour, made by expression, and whether obtained from the sweet or bitter variety is the same in properties and composition, being nearly inodorous, or having a nutty odour with a bland oleaginous taste.

Prop. & Comp. Both varieties of almonds contain about 50 per cent. of the *fixed oil*, an albuminous principle, soluble in water, called *emulsine*, with sugar, gum, and woody fibre; the bitter variety, in addition to these, possesses a peculiar white crystalline principle, *Amygdaline*, (C_{40} H_{27} NO_{22}), soluble in water and alcohol, the solutions having a slightly bitter taste. It is to the presence of this body that the peculiar properties of the bitter almond are due, for when anygdaline is acted upon by the emulsine, as occurs on moistening the almond, a species of fermentation ensues, and *hydrocyanic acid* (H Cy) and *volatile oil of bitter almonds* or hydride or hyduret of benzol (C_{14} H_5 O_2+H) are formed, with a little sugar and formic acid, and hence poisonous effects may result from such a decomposition.

The *volatile oil*, when deprived of prussic acid, is not poisonous, and resembles in appearance other volatile oils; on exposure it absorbs oxygen, and is converted into benzoic acid (C_{14} H_5 O_3 +HO); it is procured by distilling the marc, left after the expression of the fixed oil from bitter almonds, with water; that sold in the shops is intensely poisonous from the large amount (from 4 to 8 per cent.) of prussic acid contained in it.

The *fixed oil*, sp. gr. 0·92, consists of margarine dissolved in oleine, and possesses no peculiar properties distinguishing it from other fixed oils. The bitter almond is not officinal, except as a source of the fixed oil.

Off. Prep.—Of Almonds. Mistura Amygdalæ. Almond Mixture. (Compound powder of almonds, two ounces and a half; distilled water, one pint.)

Pulvis Amygdalæ Compositus. Compound Powder of Almonds.

Synonyms. Confectio Amygdalæ, *Lond.*; Conserva Amygdalarum, *Edin.*

(Jordan almonds, eight ounces; refined sugar, in powder, four ounces; gum arabic, in powder, one ounce.)

Of Almond Oil.

Used in unguentum cetacei, and unguentum simplex, &c.

Therapeutics. Sweet almonds are nutritive, from the albuminous, oleaginous, and saccharine matters contained in them; they are likewise demulcent, and are either used on account of this property, or more commonly the officinal preparations are employed as vehicles for the exhibition of other remedies: the fixed oil may be also used as a demulcent; in large doses it is purgative. Bitter almonds are poisonous in large quantities, and their exhibition is not advisable, the amount of prussic acid generated being very variable, and the officinal acid can always be prescribed with equal advantage and much greater safety. (See Acidum Hydrocyanicum Dilutum.)

Dose. Of pulvis amygdalæ compositus, 60 gr. to 120 gr.; of mistura amygdalæ, 1 fl. oz. to 2 fl. oz.; of oleum amygdalæ (fixed), 1 fl. drm. to ½ fl. oz.

Prunum. The Prune. The dried fruit of the Prunus domestica, or common Plum Tree; Lin. Syst., Icosandria monogynia; growing in Syria and in different parts of Europe.

Description. The finest and sweetest varieties are used as a condiment; the smaller kind, more acid and less pleasant, are employed in medicine. They are about an inch long, ovate, wrinkled, black, sweet, and somewhat austere.

Prop. & Comp. Prunes contain some malic acid, sugar, and a purgative principle the nature of which is unknown.

Prunes are contained in confect. sennæ.

Therapeutics. Seldom prescribed by the physician, but often used as a laxative or domestic medicine; they are somewhat apt to cause flatulence and griping.

Dose. 2 oz. and upwards. Prunes are often added to an infusion of senna to increase its purgative action and render it more palatable.

Lauro-Cerasus. The leaves of Prunus Lauro-Cerasus, or Cerasus Lauro-Cerasus, the Cherry Laurel [not officinal in U. S. P.];

Lin. Syst., Icosandria monogynia; a native of Asia Minor, but cultivated in English gardens.

Description. The leaves of the cherry laurel are four or five inches long, and about two broad; coriaceous in texture, ovate-lanceolate or elliptical, with a few dentations; shining and smooth on the upper surface, dull on the under and of a lighter colour, with two or four glands, and strong short foot-stalks; emitting a ratifia odour when bruised.

Prop. & Comp. On distillation with water they yield volatile oil and some prussic acid; neither of these substances are present in the leaves; *Amygdaline*, however, exists in them, and it is by the decomposition of this principle that the above products are obtained. (See Amygdala.)

Off. Prep. Aqua Lauro-Cerasi. Laurel Water. [Not officinal in U. S. P.] (Fresh leaves of common laurel, one pound; water, two pints and a half. Distil one pint.)

Therapeutics. Action as that of prussic acid. The strength of the above preparation is very variable, and this fact constitutes the great objection to its use, especially as all the valuable effects may be obtained by the use of the officinal acid.

Dose. 10 min. to 30 min. or more.

[Prunus Virginiana. Wild Cherry Bark. The bark of Cerasus Serotina. U. S. Lin. Syst., Icosandria monogynia. A fine tree, indigenous in the United States.

Description. The bark is in pieces of various sizes, deprived of its epiderm, of a reddish-brown colour, a bitter taste, and having an odour of bitter almonds.

Prop. & Comp. The bark contains a bitter principle and small quantities of amygdalin and emulsin, by the mutual reaction of which, in the presence of water, hydrocyanic acid is disengaged.

Off. Prep. Infusum Pruni Virginiani. A pint of infusion is made from half a troy ounce of powdered bark, by percolation with cold water.

Extractum Pruni Virginiani Fluidum. Fluid Extract of Wild Cherry Bark. Two pints of syrup, containing a little alco-

hol, are made from sixteen troy ounces of wild cherry bark, and two troy ounces of sweet almonds.

Therapeutics. Wild cherry bark is tonic, and slightly calmative and anodyne.

Dose. Of the infusion, 1 to 3 fluid ounces; of the fluid extract, 1 to 2 fl. drm.]

Cusso. Kousso. The flowers of Brayera anthelmintica [Brayera. Koosso. The flowers and unripe fruit of Brayera anthelmintica. U. S.]; they are said to be dicœcious. The tree is a native of Abyssinia, growing chiefly on elevated ground, several thousand feet above the level of the sea.

Description. Small reddish-brown flowers, on hairy stalks, the outer limb of calyx five-parted, the segments ovate reticulated. The general colour of kousso, viewed *en masse*, is yellowish green, with the purple edges of the petals of the flower appearing pretty frequently and streaking the ground colour. It has a peculiar odour, somewhat like that of tea. It is safer to buy it with the flowers whole than in a state of powder, as in the latter case it is more readily adulterated.

Prop. & Comp. Kousso may be obtained either in the form of powder or of the dried flowers. It contains a volatile oil, gum, sugar, &c., and a crystallizable principle, *koussine*, but whether its active properties are due to the latter substance is unknown.

Off. Prep. Infusum Cusso. Infusion of Kousso. [Not official in U. S. P.] (Kousso, in coarse powder, a quarter of an ounce. Boiling distilled water, four fluid ounces. Prepared without straining.)

Therapeutics. Kousso acts as an efficient anthelmintic. Whether it is superior to other remedies of the same class, is as yet doubtful; it has little or no cathartic power, and the subsequent administration of a purgative is generally required to bring away the entozoa, which the kousso seems to destroy. It has been chiefly employed in cases where the tape-worm is suspected, or known to be present. Occasionally nausea, and even vomiting, are induced by the drug.

Dose. Of kousso, ½ oz. for an adult: ⅛ oz. to ¼ oz. for a

child. Of the infusion (including the infused flowers), 4 fl. oz. to 8 fl. oz.

MYRTACEÆ.

Caryophyllum. [Caryophyllus. U. S.] Cloves. The unexpanded flower-bud, dried, of Caryophyllus aromaticus, or Clove Tree; Lin. Syst., Icosandria monogynia; growing in the East Indian Islands, Penang, Bencoolen, and Amboyna.

Caryophylli Oleum. Oil of Cloves. The oil distilled in England from cloves.

Description. The *clove* is a small, tapering, nail-like body, about six lines long, consisting of a four-toothed calyx, between which the unopened corolla is seen as a round ball; of a dark reddish-brown colour, and hot taste. The *oil*, light yellow when fresh, sp. gr. 1·055 to 1·060, has the odour and burning taste of the clove. It is one of the few volatile oils heavier than water.

Prop. & Comp. Cloves, besides the *volatile oil*, contain *resin*, *tannin*, and woody fibre. The volatile oil consists of a hydrocarbon (C_{20} H_{15}), holding in solution eugenic acid (C_{20} H_{12} O_4), and a crystallizable body, caryophylline (C_{20} H_{19} O_2), isomeric with camphor; and lastly, eugenine, probably isomeric with eugenic acid.

Off. Prep. Infusum Caryophylli. Infusion of Cloves. (Bruised cloves, quarter of an ounce; boiling distilled water, ten fluid ounces.) [Bruised cloves one hundred and twenty grains; Boiling water, a pint. U. S.]

Cloves are contained also in Pulvis Aromaticus. (See Cinnamon.)

Therapeutics. Cloves and the oil are stimulant, aromatic, and carminative; employed in atonic dyspepsia, to allay vomiting in pregnancy and relieve flatulence. The oil may be used as an adjunct to purgatives; or locally to arrest the pain of carious teeth.

Dose. Of the powdered clove, 5 gr. to 20 gr., or more; of the infusion, 1 fl. oz. to 2 fl. oz.; of the oil, 1 min. to 5 min., or more.

Incompatibles. Solutions containing cloves strike black with salts of iron, on account of the tannin.

Pimenta. Pimento. The unripe fruit of Eugenia pimenta, the Pimento or Allspice Tree; Lin. Syst., Icosandria monogynia; growing in the West Indian Islands.

Pimentæ oleum. Oil of Pimento. The oil distilled from fruit in England.

Description. Pimento is a small round two-celled berry rather larger than pepper; brown and rough on the surface, crowned with the teeth of the calyx, and containing two seeds; of an aromatic odour, and hot, aromatic taste.

Prop. & Comp. The *volatile oil*, yellow, heavier than water, consists of two portions, like that of cloves, with which it appears to be identical; besides which allspice contains a fixed oil, *resin*, *tannic acid*, and less important ingredients. The cortical portion is the most active.

Off. Prep. Aqua Pimentæ. Pimento water. [Not officinal in U. S. P.] (Pimento, bruised, fourteen ounces; water, two gallons. Let a gallon distil.)

Therapeutics. The same as cloves.

Dose. Of the powder, 5 gr. to 20 gr. or more; of aqua pimentæ 1 fl. oz. to 2 fl. oz.; of the oil, 1 min. to 5 min.

Oleum Cajuputi. Oil of Cajeput. The oil distilled from the leaves of Melaleuca minor, [Melaleuca Cajuputi. U. S.] or Cajeput Tree; Lin. Syst., Polyadelphia icosandria; growing in the Molucca Islands. The oil is imported from thence.

Description. A very transparent mobile oil, of a fine pale bluish-green colour, with a strong camphoraceous and cardamom-like odour and taste; a small quantity only is yielded by the leaves.

Prop. & Comp. Sp. gr. 0·914; when distilled at first a colourless oil passes over. Formula (C_{10} H_9 O).

Off. Prep. Spiritus Cajuputi. Spirit of Cajeput. [Not officinal in U. S. P.] Oil of cajeput, one fluid ounce; rectified spirit, nine fluid ounces.)

Therapeutics. A powerful topical and general stimulant and antispasmodic, employed in flatulent colic, hysteria, and cholera; also in chronic rheumatism and low states of the system. Ex-

ternally, when mixed with olive oil, it is used over chronic rheumatic and gouty parts.

Dose. 1 min. to 5 min., or more; of spiritus cajuputi, 10 min. to 1 fl. drm. or upwards.

Adulteration. Copper has been detected in certain samples, but is not essential to the green colour of the oil. Camphor, dissolved in oil of rosemary, and coloured by copper, is said to have been substituted for the genuine oil.

GRANACEÆ.

Granati Radix. Pomegranate Root. The bark of the root, fresh or dried, of Punica granatum; [Granati Radicis Cortex. The bark of the root of Punica Granatum. Granati Fructus Cortex. The rind of the fruit of Punica Granatum. U. S.] Lin. Syst., Icosandria monogynia; growing on the shores of the Mediterranean; chiefly imported in the dried state from Germany.

Description. The *fruit* of this tree resembles an orange, but has a coriaceous rind, and is crowned with a toothed calyx; it was formerly officinal. The *root-bark* occurs in thin quilled pieces, of a greyish colour externally, yellow within, having a short fracture, slight odour, and bitterish, but astringent taste.

Prop. & Comp. The rind of the fruit contains *tannin*, about 20 per cent., with extractive and mucilaginous matters; the root-bark contains about the same quantity of *tannin*, and a principle called *punicine* has also been detected.

Off. Prep. Decoctum Granati Radicis. Decoction of Pomegranate Root. (Pomegranate root, fresh or dry, sliced, two ounces; distilled water, forty fluid ounces. Boil down to twenty fluid ounces, and strain.)

Therapeutics. The rind of the fruit is astringent, from the tannin contained in it, and may be used externally and internally when astringents are indicated. The pomegranate root appears to possess anthelmintic properties, and has been employed for the expulsion of tape-worms.

Dose. Of decoction, 1 fl. oz. to 3 fl. oz. or more.

CUCURBITACEÆ.

Colocynthis. Colocynth. The dried decorticated fruit, freed from the seeds, of Citrullus (Cucumis) colocynthis, or Colocynth Gourd; Lin. Syst., Monœcia monadelphia; a plant growing on the shores of the Mediterranean and India; imported chiefly from Smyrna, Trieste, France, and Spain.

Description. The fruit was formerly imported from Mogador unpeeled, now only from the Mediterranean ports peeled. It consists of a globular pepo, about the size of an orange; the rind is hard and yellow, the pulp very light yellow, porous or spongy, tough, and enclosing the seeds, which form about 72 per cent. of its weight, and are ordered to be removed, as seen in the definition.

Prop. & Comp. Intensely bitter; contains a glucoside, *colocynthin* ($C_{56}H_{42}O_{23}$?), capable of being crystallized; soluble in water and alcohol, but insoluble in ether; decomposed by boiling with acids into a resin and glucose.

Off. Prep. Extractum Colocynthidis Compositum. Compound Extract of Colocynth. (Colocynth, free from seeds, six ounces; extract of Socotrine aloes, twelve ounces; scammony or resin of scammony, in powder, four ounces; hard soap, in powder, three ounces; cardamoms, in fine powder, one ounce; proof spirit, one gallon. Prepared by macerating the colocynth in proof spirit, mixing the solution thus made with the extract of aloes, scammony, hard soap, and cardamoms, and reducing by evaporation to a pilular consistence.) [Extractum Colocynthidis Alcoholicum. U. S. Alcoholic Extract of Colocynth. U. S. Made by evaporating a tincture of Colocynth obtained by maceration and percolation to dryness.

Extractum Colocynthidis Compositum. U. S.

Alcoholic extract of colocynth, three troy ounces and a half; socotrine aloes, twelve troy ounces; resin of scammony, three troy ounces; cardamom, a troy ounce; soap, three troy ounces; all in fine powder, are mixed thoroughly and kept in a well stopped bottle.]

Pilula Colocynthidis Composita. Compound Colocynth Pill. [Not officinal in U. S. P.] (Colocynth, in powder, 1 oz.; Barba-

does aloes, 2 oz.; scammony, 2 oz.; sulphate of potash, ¼ oz.; and oil of cloves, 2 fl. drm.)

Pilula Colocynthidis et Hyoscyami. Pill of Colocynth and Hyoscyamus. [Not officinal in U. S. P.] (The same as the compound colocynth pill, with the addition of 3 oz. of extract of hyoscyamus.)

[Pilulæ Catharticæ Compositæ. Compound Cathartic Pills. Compound extract of colocynth, half a troy ounce; extract of jalap, mild chloride of mercury, each one hundred and eighty grains; gamboge, forty grains. Mix and form a mass with water, to be divided into one hundred and eighty pills. U. S.]

Therapeutics. Colocynth is a powerful drastic purgative, producing watery evacuations; when given alone, it is apt to gripe; useful as an adjunct to other purgatives, to give briskness. It is employed in obstinate constipation, febrile conditions, and to relieve the portal system in dropsical effusions, and uterine obstructions; also as a derivative in head affections.

Dose. Of the powdered pulp, 2 gr. and upwards; rarely used; of the compound extract, 2 gr. to 10 gr.; of pil. coloc. comp., 5 gr. to 12 gr.; of pil. coloc. et hyoscyami, 5 gr. to 15 gr.; [of Pil. Cathart. Comp. 2 to 4.]

Adulteration. The extract is not unfrequently made with the pulp and seeds, which yields a larger, but a less active product; the use of the pulp free from seeds should be strictly adhered to in making the officinal preparations.

Elaterium. Elaterium. A sediment from the expressed juice of the fruit of Ecbalium Officinarum or Squirting or Wild Cucumber [a substance deposited by the juice of the fruit of the Momordica Elaterium, Ecbalium Agreste. U. S.] Lin. Syst., Monœcia syngenesia; growing in Greece and Southern parts of Europe; also cultivated in England.

Description. The fruit of Ecbalium officinarum is a small elliptical pepo, about 1½ inch long, covered with soft prickles, containing the seeds surrounded by a juicy tissue: these, when ripe, are expelled forcibly, hence the English name of the plant. Elaterium itself occurs in the form of thin flattened or slightly incurved pieces about 1 line thick; light, friable; of a green colour when

fresh, becoming grey on exposure to light. The fracture is finely granular.

Prep. Elaterium is prepared by cutting the fruit lengthwise, and lightly pressing out the juice, which is strained through a hair sieve; the expressed juice is set aside to deposit; the sediment poured on a linen filter and dried on porous bricks at a gentle heat. This was formerly called the extract.

Prop. & Comp. Elaterium contains an active principle, *elaterine* or *momordicine* (C_{20} H_{14} O_5), which forms silky prisms, soluble in alcohol, but very slightly so in water or ether, forming in good elaterine from 20 to 30 per cent.; also a *green resinous matter*, soluble in ether, probably chlorophyl, together with woody fibre, &c.

Therapeutics. A drastic hydragogue purgative used chiefly in dropsical affections, especially those connected with cardiac disease: sometimes causes nausea and great depression, hence it should be carefully administered; also apt to produce gastro-enteritis.

Dose. Of elaterium (good), $\frac{1}{12}$ to $\frac{1}{2}$ gr.; of crystallized elaterine or momordicine, $\frac{1}{24}$ gr. to $\frac{1}{6}$ gr.

Adulteration. Elaterium is often very inferior, containing starch or flour, also chalk, and but little elaterine, often not more than 4 or 6 per cent. Elaterium should not give a blue colour with iodine, nor effervesce when an acid is added. 100 grains should yield 50 grains to boiling rectified spirit; and when this solution is concentrated and added to a warm solution of potash, at least 20 grains of crystallized elaterine should be precipitated on cooling. The green colouring matter is soluble in the alkaline solution, but the elaterine is insoluble.

UMBELLIFERÆ.

Conium. Hemlock. The fresh leaves and branches of Conium maculatum, Hemlock (the wild herb); Lin. Syst., Petandria digynia; gathered when the fruit begins to form; indigenous, growing in hedges and wild places. The leaves should be dried either in the sun or at a temperature not above 120°.

Conii Fructus. Hemlock Fruit. [Not officinal in U. S. P.] The ripe dried fruit of the same plant.

Description. The *leaves* are deep green, shining, tripinnate, with pinnatifid leaflets, petioles furrowed and sheathing at the base; the stem is smooth and purple-spotted. The *seeds*, or rather *fruit*, are broadly ovate, compressed laterally, and distinguished from other umbelliferous fruits by having undulating crenulated ridges and no vittæ.

Prop. & Comp. The leaves, when fresh, have a peculiar odour. All parts contain *Conia* ($C_{16}H_{15}N$), a liquid volatile alkaloid, with a powerful odour; colourless when pure; lighter than water; but slightly soluble in water; soluble in ether and alcohol, producing a greasy stain on paper, it is united with *coniic acid*, and a trace of *volatile oil*. The vapour is inflammable. When potash is added to any part of the plant the conia is set free, and can be detected by its odour and the fumes which it gives with hydrochloric acid.

Off. Prep.—Of Conium (leaves). Cataplasma Conii. Hemlock Poultice. [Not officinal in U. S. P.] (Hemlock leaf in powder, one ounce; linseed meal, 3 ounces.)

Extractum Conii. Extract of Hemlock. (Prepared in the same manner as the other green extracts.)

[Tinctura Conii. Tincture of Conium. U. S. Two pints of tincture are procured from four troy ounces of recently dried hemlock leaves by percolation with diluted alcohol.]

[Extractum Conii Fluidum. U. S. A tincture is obtained by percolating sixteen ounces of recently dried hemlock leaves with diluted alcohol, to which half a fluid ounce of acetic acid has been added. The tincture is evaporated at a temperature not exceeding 150°, so as to form sixteen ounces of fluid extract.]

Succus Conii. [Not officinal in U. S. P.] (The expressed juice of the fresh leaves with one part of rectified spirit added to every three parts of the juice.)

Of the Conium Fruit. Tinctura Conii Fructus. Tincture of Hemlock Fruit. [Not officinal in U. S. P.] (Hemlock fruit, bruised, two ounces and a half; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.) At least twice the strength of the tincture of conium of the London Pharmacopœia.

[Extractum Conii Alcoholicum. Alcoholic Extract of Conium. U. S. Made by evaporating at a low heat, a tincture procured by percolation with dilute alcohol.]

Therapeutics. Conium seems to act as a direct sedative, especially on the spinal cord, and in very large doses causes paralysis; it is used to allay cough in bronchitic affections, pertussis, and phthisis; formerly thought to be curative of cancerous diseases; it often alleviates in such cases, allaying pain and improving general health. Conium may also be applied externally to ease pain.

Dose. Of the powdered leaf, 3 gr. to 10 gr. or more; of the extract, 2 gr. to 5 gr. or more; of succus conii, 30 min. to 1½ fl. drm.; of the tincture, 20 min. to 1 fl. drm. or more. [Of the fluid extract, 5 min.]

Assafœtida. The gum resin exuding, after incision, from the living root [The concrete juice of the root. U. S.] of Narthex assafœtida; Lin. Syst., Pentandria trigynia; a native of Persia, Affghanistan, and the Punjaub.

Description. Generally in masses of agglutinated tears, sometimes in separate tears; moist or dry. The masses, when cut, are amygdaloid in appearance, consisting of the harder whitish tears, with softer and brownish-red uniting matter; assafœtida becomes pink, then dark red on exposure; its odour is very strong, and alliaceous, taste bitter, and rather acrid.

Prop. & Comp. Assafœtida dissolves almost entirely in rectified spirits. It contains *volatile oil*, about 4 per cent., consisting of sulphurets of allyl ($C_{12}H_{11}S + C_{12}H_{11}S_2$), *resin* 65 per cent., *gum* 25 per cent., and some saline matters. When rubbed with water, the gummy matters dissolve, and the resin and volatile oil are suspended, and hence an emulsion is formed.

Off. Prep. Enema Assafœtidæ. Enema of Assafœtida. [Not officinal in U. S. P.]

Synonym. Enema Fœtidum. *Edin., Dub.* (Tincture of assafœtida, six fl. drms.; mucilage of starch, six fl. ounces.)

Pilula Aloes et Assafœtidæ. Pill of Aloes and Assafœtidæ. (Socotrine aloes in powder, one ounce; assafœtida, one ounce; hard soap, in powder, one ounce; confection of roses, one ounce.) [Socotrine Aloes, Assafetida, hard soap, all in fine powder, of each, half a troy ounce. Beat with water, to form a pilular mass, and divide into one hundred and eighty pills. U. S.]

Pilula Assafœtidæ Composita. Compound Pill of Assafœtida. [Not officinal in U. S. P.] (Assafœtida, two ounces;

galbanum, two ounces; myrrh, two ounces; treacle by weight, one ounce.) [Pilula Assafetida. Pills of Assafetida. U. S. Assafetida, a troy ounce and a half; soap, in fine powder, half an ounce. Beat with water to form a pilular mass; to be divided into two hundred and forty pills.]

Tinctura Assafœtidæ. Tincture of Assafœtida. (Prepared by maceration. Assafœtida, in small fragments, two ounces and a half; rectified spirit, twenty ounces.) [Assafetida, four troy ounces; alcohol, two pints. U. S.]

Therapeutics. Assafœtida acts on the nervous system as a stimulant and powerful antispasmodic, and is especially useful in hysterical convulsive affections; likewise in pertussis, asthma, and other nervous diseases; in tympanitis it may be administered as an enema. It is useful also in some forms of chronic bronchitis, from the expectorant powers it possesses.

Dose. Of the gum resin, 5 gr. to 30 gr. or more; of the tincture, ½ fl. drm. to 1 fl. drm. or more. Of pil. aloes et assafœtidæ, 4 gr. to 10 gr.; of pil. assafœtidæ com., 5 gr. to 15 gr.

Adulteration. Mechanical impurities, as sand, stones, &c., occasionally met with.

Galbanum. The gum resin derived from an unascertained umbelliferous plant (Galbanum officinale?). Some doubt exists as to its true origin. It comes from the Levant and India.

Description. In masses of a greenish yellow colour, translucent, or more rarely in separate tears, about the size of a pea. Harder, lighter coloured, of less intense odour, and more agreeable than assafœtida, of a bitter acrid taste.

Prop. & Comp. Galbanum contains less *volatile* oil than assafœtida. The *resin* has the composition (C_{40} H_{27} O_7). The volatile oil is generally supposed to contain sulphur; however, the author has examined galbanum with a view of ascertaining the correctness of this opinion, and has failed to detect that element.

Off. Prep. Emplastrum Galbani. Galbanum Plaster. (Galbanum, one ounce; ammoniac, one ounce; yellow wax, one ounce; litharge plaster, eight ounces.) [Emplastrum Galbani Compositum. U. S. Galbanum, eight troy ounces; turpentine, a troy ounce; Burgundy pitch, three troy ounces; lead plaster, thirty-six troy ounces.]

Galbanum forms an important ingredient in pilula assafœtidæ composita.

Therapeutics. Similar to assafœtida, but less powerful. Externally it is used to indolent tumours, with an idea of its possessing discutient powers. Galbanum is probably allied to ammoniacum in its action, and may be used as a stimulating expectorant.

Dose. Of the gum resin, 10 gr. to 30 gr. or more.

Sagapenum. (Not now officinal.) The gum resin from an unknown plant, belonging to the order Umbelliferæ: it is imported from the Levant.

Description. In tears or masses, generally the latter; more yellow than assafœtida; in odour it somewhat resembles that drug.

Prop. & Comp. It contains a small amount of volatile oil, and a large quantity of resin. The author has failed to detect sulphur in the oil which has usually been supposed to contain that element.

Therapeutics. In its action on the system, it is closely allied to assafœtida and galbanum: it is seldom used by itself, but formed a part of the compound galbanum pill of the London Pharmacopœia, 1851.

Dose. Of the gum resin, 10 gr. to 30 gr. or more.

Opoponax, in London Pharmacopœia of 1836; a gum resin in tears, obtained from Opoponax chironium. Its properties are similar to those of the other fœtid gum-resins.

Ammoniacum. Ammoniac. The gum-resinous exudation from the stem and pedicel of Dorema ammoniacum, indurated by the air; [The concrete juice of Dorema Ammoniacum. U. S.] Lin. Syst., Pentandria digynia; growing in Persia and the Punjaub. Stated to exude from punctures in the plant made by beetles.

Description. In separate tears, or in masses; the tears from two to eight lines in diameter, pale, cinnamon brown colour, fracture smooth, white and opaque, but becoming yellow on exposure; the masses are composed of agglutinated tears presenting an amygdaloid appearance, very similar to some specimens of gum benzoin; ammoniacum is brittle when cold, but softens

readily with heat; its odour is slight but peculiar; taste bitter and rather acrid; it forms a milky emulsion when rubbed with water.

Prop. & Comp. *Resin*, about 7 per cent.; *gum*, 20 per cent.; *volatile oil*, 4 per cent. When rubbed with water the resin and oil are suspended by the dissolved gum. The oil differs from that of assafœtida in not containing sulphur.

Off. Prep. Emplastrum Ammoniaci cum Hydrargyro. Ammoniac Plaster with Mercury. (Ammoniac, twelve ounces; mercury, three ounces; olive oil, one fluid drachm; sulphur, eight grains.)

Mistura Ammoniaci. Ammoniac Mixture. (Ammoniac a quarter of an ounce; distilled water, eight fluid ounces.)

Ammoniac is contained also in pilula scillæ composita, and emplastrum galbani.

Therapeutics. Less antispasmodic than assafœtida, but it seems more expectorant; it is used chiefly in chronic bronchitic affections. Externally, as a stimulant discutient over indolent tumours, &c.

Dose. Of the gum resin, 10 gr. to 30 gr. or more; of the mixture, ½ fl. oz. to 1 fl. oz.

Anisi Oleum. Oil of Anise. The oil distilled from the fruit of Pimpinella anisum, or Anise; Lin. Syst., Pentandria digynia; distilled in Europe. Also from the fruit of Illicium anisatum, Star Anise (natural order, Magnoliaceæ), distilled in China.

Description. The mericarps, commonly called *seeds*, not now officinal, are oblong-ovate, downy, have five primary ridges, three vittæ in each channel; of a dingy yellowish-green colour. The *volatile oil*, oleum anisi, upon which the activity of the mericarp depends, is of a light straw colour; sp. gr. from 0·977 to 0·99.

Prop. & Comp. Oil of anise consists of two portions, one heavier than water, and solid at ordinary temperatures; the other liquid, and more volatile; the former, called *stearoptene*, is an oxidized compound (C_{20} H_{12} O_2) and forms four-fifths of the weight of the oil; the latter, or liquid portion, *eleoptene* is isomeric with oil of turpentine (C_{20} H_{16}).

Therapeutics. Stimulant aromatic, and carminative; used

to relieve flatulence, and to diminish the griping of purgative medicines.

Dose. Of the oil, 2 min. to 5 min.

Fœniculum. Sweet Fennel Fruit. The fruit of Fœniculum dulce [vulgare. U. S.], Fennel; Lin. Syst., Pentandria digynia; grows in most parts of Europe, imported fron Malta.

The fruit is about three lines long and one broad, elliptical, slightly curved, beaked, having eight pale brown longitudinal ribs, the two lateral being double.

Description. The mericarps, often called seeds, are oblong, convex on one surface, flat on the other; many of the mericarps are connected together by their flat surfaces, some single, of a dark grayish colour; footstalks often attached. The oil is of a light yellow colour, with the characteristic odour of the seeds.

Prop. & Comp. The oil, which is the active ingredient, is of sp. gr. 0·99; it consists of two parts, one more volatile than the other; the more solid one named *stearoptene*, the other *eleoptene*. These appear to have the same composition as the corresponding constituents of the oil of anise.

Off. Prep. Aqua Fœniculi. Fennel Water. (Sweet fennel fruit bruised, twenty ounces; water, two gallons, distil one gallon.) [Oil of fennel, half a fluid drachm; carbonate of magnesia, sixty grains; water, two pints. Rub the oil first with the magnesia, then with the water, and filter. U. S.]

Therapeutics. Stimulant, aromatic, and carminative; used to relieve flatulence and diminish griping.

Dose. Of oleum fœniculi, 2 min. to 5 min.; of aqua fœniculi, 1 fl. oz. to 2 fl. oz.

Cyminum. (Not officinal.) The fruit of Cuminum cyminum, or Cumin; Lin. Syst., Pentandria digynia; native of Egypt, but cultivated in Malta, Sicily, and other parts of Europe.

Description. These mericarps are somewhat larger than the caraway, concave-convex, with five primary and four secondary ridges; four vittæ under the latter, *i.e.*, one under each; odour, peculiar; taste, warm.

Prop. & Comp. Their properties depend on the presence of

a *volatile oil*, which is of a yellow colour, and lighter than water; consisting of *cymol* (C_{20} H_{14}) and *cuminol* (C_{20} H_{12} O_2); the former the more volatile.

Therapeutics. Action the same as that of the other carminative fruits and oils; very seldom used.

Coriandrum. Coriander. The ripe dried fruit of Coriandrum sativum, Coriander seeds; Lin. Syst., Pentandria digynia; native of Italy, cultivated in England, and naturalized in most parts of Europe.

Oleum Coriandri. Oil of Coriander. [Not officinal in U. S. P.] The oil distilled in England from coriander.

Description.—Of the fruit. The fruit is of a globular form, beaked, finely ribbed, yellowish brown, nearly as large as white pepper, consisting of two adherent carpels which are readily separated; odour and taste, aromatic.

Prop. & Comp. The *oil*, which is the active ingredient, is yellowish, and has the odour of coriander; but little is known of its chemical nature.

Off. Prep. Coriander is an ingredient of many of the compound preparations of the Pharmacopœia, and oleum coriandri is contained in the syrupus sennæ.

Therapeutics. Stimulant, aromatic, and carminative; rarely given alone.

Dose. Of the oil, 2 min. to 5 min.; of the powdered fruit, 10 gr. to 30 gr. or more.

Carui. Caraway. The dried fruit of Carum carui, or Caraway; Lin. Syst., Pentandria digynia; cultivated in England and Germany.

Carui Oleum. Oil of Caraway. The oil distilled in England from caraway fruit.

Description. The caraway *seeds* (mericarps) are slightly curved, with fine filiform ridges, and contain a single vitta in each channel. The longitudinal ridges of a lighter colour than the intervening interstices. Colour, brownish, with a peculiar aromatic odour and warm taste. The *oil* is of a pale yellow colour, with the odour of the fruit, and a spicy taste.

Prop. & Comp. The fruit, besides the common constituents of a

mericarp, yields the *volatile oil*, on the presence of which its medicinal value depends. The sp. gr. of the oil is 0·946 ; its colour is darkened by long keeping. It consists of two liquid portions, the unoxidized *carvine* ($C_{20}H_{16}$), the oxidized *carvol* ($C_{20}H_{14}O_2$).

Off. Prep. Aqua Carui. Caraway Water. [Not officinal in U. S. P.] (Caraway, bruised, two ounces ; water, two gallons, distil one gallon.)

Caraway is contained in many officinal preparations.

Therapeutics. Caraway is an aromatic, stomachic, and carminative, often used as a corrector of flatulence, and as an adjunct to other medicines ; the oil is often added to purgative medicines to prevent griping.

Dose. Of the aqua carui, 1 fl. oz. to 2 fl. oz. ; of oleum carui, 2 min. to 5 min.

Anethum. Dill. Fruit of Anethum graveolens, or Dill; [Not officinal in U. S. P.] Lin. Syst. Pentandria digynia; cultivated in England, or imported from middle and southern Europe.

Anethi Oleum. Oil of Dill. Oil distilled in England from the fruit.

Description. The seeds (fruit) are of brown colour, oval, somewhat flattened, about a line and a half in length, convex on one side, and concave on the other ; they have five primary ridges, and one vitta in each channel. Pale membranous alæ. The oil is of a pale yellow colour, and aromatic odour ; taste, acrid sweetish.

Prop. & Comp. Dill owes its peculiar properties to the *volatile oil*. This oil resembles in appearance that of caraway ; its sp. gr is 0·881. Its composition is probably analogous to that of the other umbelliferous oils.

Off. Prep. Aqua Anethi. Dill Water. (Bruised dill, twenty ounces ; water, two gallons ; let a gallon distil.)

Therapeutics. Stimulant, aromatic, and carminative : chiefly used in the flatulence of infants.

Dose. Of the aqua anethi, 1 fl. oz. to 2 fl. oz. ; for infants, 1 fl. drm. to 2 fl. drm. ; of oleum anethi, 2 min. to 5 min.

Carota. (Not officinal.) Recent root of the Daucus carota (var. sativa), Carrot ; [The fruit of Daucus Carota. U. S.] Lin. Syst.,

Pentandria digynia; cultivated in the gardens of this country.

Description. This root is too familiar to need description.

Prop. & Comp. It contains, besides a little *volatile oil*, albumen, salts, &c., a crystallizable substance, *carotine*, neutral, of a fine red colour; also *pectin*, the gelatine of the vegetable kingdom.

Therapeutics. It is used as a cataplasm to correct the fœtor of phagedenic ulcers. It acts probably as a slight stimulant when applied in the fresh state to an ulcerated surface. [The seeds are carminative and slightly diuretic. They are given in infusion.]

Sumbul. Musk Root. (Not officinal.) Supposed to be the root of an umbelliferous plant, but the plant itself is unknown; it is said to grow in the north and eastern parts of India. It comes through Russia and Bombay. It is now said to be the root of Nardostachys jatamansi, a valerianaceous plant, the true spikenard of the ancients.

Description. The drug as obtained in this country is in circular pieces, consisting of transverse sections of the root three or four inches in diameter. The epidermis of a light brown colour, wrinkled; the inner substance consists of coarse irregular fibres, easily separated: on looking at a transverse section, it appears porous through the greater part of its diameter, and the bundles of fibres are loosely packed together. The odour is strong and musk-like, hence its name.

Prop. & Comp. It yields, on distillation, a *volatile oil*, *resin*, starch, and an acid capable of crystallization, named *sumbulic* acid.

Prep. It is given in substance, in powder, or pills; also as tincture (two ounces of root to sixteen fluid ounces of proof spirit, or spirit of ether).

Therapeutics. It appears to be a nervine stimulant, similar in its action to valerian. In Russia it has been used in cholera, and febrile diseases of a typhoid or adynamic type. It has been recommended in epilepsy, chorea, and other nervous disorders, and its use is said to be attended with much benefit in cases of delirium tremens. Its action requires further investigation.

Dose. Of the tincture, ½ fl. drm. to 2 fl. drm.; of the powder 20 gr. to 60 gr.

CAPRIFOLIACEÆ.

Sambucus. Elder Flower. The recent flower of Sambucus niger, [Sambucus canadensis. U. S.] Lin. Syst., Petandria trigynia; indigenous.

Description. The flowers are small, white, having a peculiar odour, in five-parted cymes.

Prop. & Comp. They yield on distillation a *volatile oil*, to the presence of which they owe their odour. Their active ingredients are soluble in water; no peculiar crystallizable principle has been obtained from them; they contain ingredients common to most flowers.

Off. Prep. Aqua Sambuci. Elder-Flower Water. [Not officinal in U. S. P.] (Elder flowers, ten pounds; water, two gallons. Let a gallon distil.)

Therapeutics. The flowers are gently stimulant in their action, and are used as a topical application, in the form of ointment, made by heating the flowers in hot lard; the water is employed as a pleasant vehicle for the exhibition of medicines or for lotions. The inner bark of the elder tree possesses hydragogue and cathartic powers, and has been used with success to remove the fluid in dropsies. It may be given in the form of decoction, the strength being about four ounces to the pint; of this, two to four ounces may be given as a dose.

Dose. Of aqua sambuci, 1 fl. oz. to 2 fl. oz.

[The properties of the Sambucus canadensis appear to be identical with those of Sambucus niger.]

CINCHONACEÆ.

Cinchona flava. Yellow Bark. From Cinchona calisaya.

Cinchona pallida. Pale or Brown Bark. From Cinchona condaminea.

Cinchona rubra. Red Bark. From Cinchona succirubra. [The bark of an undetermined species of Cinchona called in commerce Red Bark, and yielding not less than two per cent. of alkaloids containing crystallizable salts. U. S.]

Quiniæ Sulphas. Sulphate of Quina. A crystalline salt, pre-

pared from the bark of Cinchona flava (calisaya), and from the bark of Cinchona lancifolia. *Mutis.*

All the different species of Cinchona belong, in the Linnæan system, to Pentandria monogynia, and inhabit the Andes, chiefly on the eastern face of the Cordilleras, from 4,000 to 12,000 feet above the sea, and extending from 10° of North latitude to 20° of South latitude, growing therefore in Peru, Bolivia, and Columbia. Dr. Karsten gives the following description of the locality favourable to the growth of Cinchona:—"The cinchonæ which are rich in alkaloids inhabit the peculiar cloudy region of the Andes, in which, during the rainy season, which continues for nine months in the year, a steady rain is only interrupted during the day by short gleams of sunshine, interchanging with clouds and mist; whilst in that part of the year which answers to our winter, cold nights, in which the temperature of the air descends to freezing point, are followed by days in which the rays of the sun, piercing here and there, through the thick clouds, raise the temperature to 77° Fah.; whilst the leaves are kept almost continually bedewed by the continual mists. Ravines stretching upwards into the grass-covered region, and filled with forest vegetation, are the channels by which the streams of air ascend, when the mid-day sun warms the leafy covering of the mountain side. Here the mist first begins to form, when the strata of warm air, containing much aqueous vapour, mix with the colder atmospheric currents descending from the icy summits, and there ensues a frequently-repeated alternation of thick mist, which entirely bedews the surface of plants, and of warm sunbeams, which dry and warm the moistened leaves. This lasts till late in afternoon, when misty clouds overspread the whole district, until they are condensed by the cold of the night, to be again raised into vapour by the morning sun. This is the peculiar climate of those Cinchonæ which are rich in organic bases." Endeavours are now being made to cultivate the more important species of cinchona plants in India (Neilgherries), Ceylon, Java, Jamaica, and Trinidad.

Description. Until recently great doubt existed as to the origin of the different kinds of cinchona barks, but the recent researches of Weddel have thrown much light upon the subject; still the tree or trees from which red bark is obtained is involved in mystery.

Cinchona flava, or true yellow bark, which has been shown by Weddel to be obtained from Cinchona calisaya (of which there are at least two varieties, vera and Josephiana, the latter a shrub), occurs in two forms, in quills or flat pieces; the former, the quills, are from 6 to 18 inches in length, and from 1 to 3 inches in diameter, with a thickness varying from $\frac{1}{5}$ to $\frac{1}{3}$ of an inch. The quills are generally single, and the bark is covered with a brown epidermis, mottled with white or yellowish lichens, and marked with longitudinal wrinkles and transverse or circular fissures. The latter, or flat pieces, are more fibrous, denuded of the epidermis, and of a cinnamon colour. Both varieties are very bitter in taste, and break with a fibrous fracture and the escape of a powder.

Cinchona calisaya inhabits the forests of southern Peru. Yellow bark is rich in quinine; and 100 grains should yield not less than 2 grains of quinia.

Cinchona pallida, pale Brown or Loxa bark, is the produce of Cinchona condaminea; always occurs in quills, which are single or double, from 6 to 15 inches in length, from $\frac{1}{8}$ to $\frac{3}{4}$ inch in diameter, and from $\frac{1}{20}$ to $\frac{1}{10}$ inch in thickness: it is marked with longitudinal wrinkles, and tranverse or circular cracks; the epidermis brown or grey, and frequently covered with crustaceous and stringy lichens; the inner surface cinnamon-brown in colour, and smooth: the taste is bitter and astringent; the fracture short and not fibrous, except in the larger pieces; the medium-sized quills are most esteemed.

Cinchona condaminea is found in the forests of Loxa, in the Republic of Equador.

Pale bark yields cinchonia chiefly; and 200 grains of the bark treated in the manner directed in the test for yellow cinchona bark, with the substitution of chloroform for ether, should yield not less than 2 grains of alkaloids.

Cinchona rubra, red bark, from Cinchona succiruba, occurs in quills or flattened pieces, more frequently the latter; covered with a brownish-red epidermis, rarely white from adherent lichens; occasionally strongly tuberculated on the surface, and then termed warty; internally rough, fibrous, and of a dark red chestnut colour; the taste is very bitter, the fracture finely fibrous

and red; the bark varies from about 6 to 24 inches in length, and the flattened pieces are sometimes 4 or 5 inches broad, and ½ inch or more in thickness.

Cinchona succiruba grows in the forests at the foot of the great mountain of Chimborazo.

Red bark yields quinia and cinchonia in about equal quantities; and 100 grains of the bark, treated in the manner directed in the test for Cinchona pallida, should yield not less than 2 grains of alkaloids.

Besides the above-described officinal barks, from which alone the pharmaceutic preparations should be made, there are others which are at the present day extensively employed for the extraction of the alkaloids; among these the most important are the orange Carthagena bark and the grey bark.

Fibrous Carthagena Bark, called also Spongy or Orange Carthagena Bark, Bogota, and Coquetta Bark, the produce of Cinchona lancifolia (*Mutis*,) is referred to in the Pharmacopœia as one of the sources of quinine. It occurs in quills or flattened pieces, according to the age of the stems from which it is peeled; the surface is often covered with crustaceous lichens, giving it a silvery appearance. The bark is characterized by its extremely fibrous texture, often breaking with long stringy splinters; the texture is loose and spongy; the colour, especially of the larger pieces, is strongly yellow or sometimes orange; hence the name. The powder is also yellow, with an orange tint.

This bark yields quinine, much quinidine, also some cinchonine.

Cinchona lancifolia grows at a great elevation in the forests near Bogota, in New Granada, and is now known as Cinchona condaminea (var. δ lancifolia.)

Cinchona cinerea, silver, grey, or Huanuco Bark formerly officinal in the Edinburgh and Dublin Pharmacopœias, is the produce of Cinchona micrantha and Cinchona nitida; it occurs in quills, which are in general larger and coarser than those of the Brown bark; with a greyish epidermis, less wrinkled longitudinally and less completely cracked transversely; the smaller quills are often twisted spirally; and on the inner surface the bark is more uneven, and of a redder colour than Loxa or Brown bark. The produce of Cinchona nitida and Cinchona micrantha are usually

mixed together; that from the former tree is superior. These trees grow in the forests of Cuchero and Huanuco in northern Peru. The barks are rich in quinine, quinidine, and cinchonine.

For the description of other cinchona barks used in commerce for the extraction of the alkaloids, the reader is referred to more extended works on the subject, especially to the article cinchona, the last effort of the late Dr. Pereira and Howard's illustrations.

Prop. & Comp. The different barks are closely allied to each other in composition: they all contain acid and alkaline principles peculiar to the genus Cinchona, together with other matters common to many kinds of barks. The acids of the cinchona barks are as follows:

Quinic or *Kinic Acid* (2 HO, C_{28} H_{20} O_{20}) can be crystallized in oblique rhombic prisms, resembling tartaric acid in appearance; soluble in water, and acid in taste; less soluble in alcohol, and very sparingly soluble in ether; it yields a yellow, crystallizable pungent, sublimate, *kinone* (C_{12} H_4 O_4) when distilled with some oxidizing agents.

Cincho-tannic Acid (C_{28} H_{19} O_{17}?) differs from ordinary tannin or tannic acid, in precipitating the persalts of iron, green, and rapidly absorbing oxygen, especially when united with an alkali.

Red Cinchonic supposed to be produced by the oxidation of cincho-tannic acid; a red substance, hence its name; almost insoluble in water, but soluble in alcohol, ether, alkalies, and acids; the solutions have a deep red colour.

Kinovic Acid found in many kinds of barks; in its chemical characters it somewhat resembles stearic acid; its solutions precipitate copper green, a reaction employed as a test of its presence.

Quinia or *Quinine* (C_{40} H_{24} N_2 O_4), or with 6 equivalents of water when crystallized, the most important alkaloid contained in the barks, exists in the largest quantities in Calisaya bark; when pure, it is white, crystallizing with some difficulty as the hydrate; soluble in about 350 parts of cold water, 60 parts of ether, and very soluble in alcohol; fuses, when heated, into a resinous mass; forms salts with acids, and its solutions exhibit a fluorescent appearance, and when treated with excess of chlorine water and ammonia afterwards added, a dark emerald-green liquid is pro-

duced. Quinia forms crystallizable salts with acids; the best known is the officinal salt, Quiniæ Sulphas or sulphate of Quinine.

Cinchonia or *Cinchonine* (C_{40} H_{24} N_2 O_2), an alkaloid contained chiefly in the pale varieties of bark, it readily crystallizes from its alcoholic solution in brilliant colourless four-sided prisms; it is almost insoluble in water and ether, and requires about 30 parts of rectified spirit to dissolve it; unites with acids, and forms soluble salts, the solutions of which are not fluorescent, and do not give the green colour with chlorine and ammonia, but merely become light brownish-yellow.

Quinidina or *Quinidine*, a third alkaloid, contained in many of the cinchona barks, especially in those of New Granada, and isomeric with quinine (C_{40} H_{24} N_2 O_4), with 4 equivalents of water when crystallized, occurs, when pure, in white prisms, readily crystallizing from alcohol, and also when precipitated from the watery solutions of its salts, by means of an alkali; it is very bitter, but less intensely so than quinia, and its solutions are fluorescent: it is much less soluble in water than quinia, and less soluble in ether, and its sulphate is also much more soluble than that of quinia, much less so than that of cinchonia. The solutions of quinidine, when treated with chlorine water and ammonia, show the emerald-green appearance, as in the case of quinine.

Cinchonidina or *Cinchonidine* (C_{40} H_{24} N_2 O_2), a fourth alkaloid, found in cinchona barks, and isomeric with cinchonine, occurs in hard, brilliant, striated, rhomboidal prisms, which are anhydrous, and insoluble in ether; it forms crystallizable salts, the solutions are fluorescent, but when treated with chlorine water, and subsequently with ammonia, do not give rise to the emerald-green colour.

M. Pasteur, from an examination of *quinine*, *quinidine*, *cinchonine*, and *cinchonidine*, finds that *quinine*, by being carefully heated in the form of a salt, as the tartrate, is changed into an isomeric body, *quinicine*, and *cinchonine*, under like circumstances, into *cinchonicine*, substances similar to them, but amorphous; and he also finds that *quinidine* and *cinchonidine* are converted into the same isomeric substances, *quinicine* and *cinchonicine*. According to Pasteur, *quinine* and *quinidine* strike green with chlorine and ammonia, but *cinchonine* or *cinchonidine*

do not, and the alkaloid, usually designated *quinidine* commonly, consists chiefly of *cinchonidine*.

The following are the relations in which the four alkaloids and their isomeric modifications stand in regard to their action upon polarized light.

Quinine turns the plane of polarization powerfully to the left hand.
Cinchonidine " " " "
Cinchonine turns the plane of polarization strongly to the right hand.
Quinidine " " " "
Both quinicine and cinchonicine turn the plane of polarization feebly to the right hand.

An alkaloid *aricine* ($C_{20}\,H_{12}\,NO_3$?) was found by Pelletier in arica; it has not, however, been rediscovered, and some doubts exist with regard to it. It is stated to crystallize in needles, to be soluble in ether, and give an intense green colour with nitric acid. Guibourt has obtained cinchonia, not aricina, from the same bark.

The substance known by the name of *quinoidine* consists of resinous and colouring matters, with the above alkaloids more or less changed by the processes to which they have been subjected; it is obtained from the liquors from which the sulphate of quina has been crystallized; it was from this substance that Liebig obtained his *amorphous quinine*, which bears the same relation to the crystallized alkaloid as uncrystallizable syrup does to ordinary sugar; probably it is closely allied to quinicine.

The salts of the cinchona alkaloids commonly used in medicine are as follows:—

Quiniæ Sulphas. Sulphate of Quinia ($C_{40}\,H_{24}\,N_2\,O_4$, HO, SO_3 +7 HO), it occurs in snow-white feathery crystals, requiring for solution about 60 parts of strong spirit, and 750 parts of water; and the watery solution, treated with chlorine, and ammonia, gives the green test before noticed, and also exhibits fluorescence; it has all the characters of a neutral salt. For the adulterations, &c., of sulphate of quinia, see page 261.

Prep. The following are the directions given for the preparation of the sulphate in the British Pharmacopœia: "Take of yellow cinchona bark, in coarse powder, one pound; hydrochloric

acid, three fluid ounces; distilled water, a sufficiency; solution of soda, four pints; dilute sulphuric acid, a sufficiency. Dilute the hydrochloric acid with ten pints of the water. Place the cinchona bark in a porcelain basin, and add to it as much of the dilute sulphuric acid as will render it thoroughly moist. After maceration, with occasional stirring for twenty-four hours, place the bark in a displacement apparatus, and percolate with the diluted hydrochloric acid, until the solution which drops through is nearly destitute of a bitter taste. Into this liquid pour the solution of soda, agitate well, let the precipitate completely subside, decant the supernatant fluid, collect the precipitate on a filter, and wash it with cold distilled water, until the washings cease to have colour. Transfer the precipitate to a porcelain dish containing a pint of distilled water, and applying to this a steam heat, gradually add dilute sulphuric acid until very nearly the whole of the precipitate has been dissolved, and a neutral liquid has been obtained. Filter the solution while hot through paper, wash the filter with boiling distilled water, concentrate till a film forms on the surface of the solution, and set it aside to crystallize. The crystals should be dried on filtering paper without the application of heat."

["Take of yellow cinchona, in coarse powder, forty-eight troy ounces; muriatic acid, three troy ounces and a half; lime, in fine powder, five troy ounces; animal charcoal, in fine powder, sulphuric acid, alcohol, water, distilled water, each, a sufficient quantity. Boil the cinchona in thirteen pints of water, mixed with one-third of the muriatic acid, and strain, through muslin. Boil the residue twice successively with the same quantity of water and acid as before, and strain, mix the decoctions, and, while the liquid is hot, gradually add the lime, previously mixed with two pints of water, stirring constantly, until the quinia is completely precipitated. Wash the precipitate with distilled water, and, having pressed, dried, and powdered it, digest it with boiling alcohol. Pour off the liquid, and repeat the digestion several times until the alcohol is no longer rendered bitter. Mix the liquids, and distil off the alcohol until a brown viscid mass remains. Upon this, transferred to a suitable vessel, pour four pints of distilled water, and, having heated the mixture to the boiling point, add as much sulphuric acid as may be necessary to dissolve the quinia. Then add a troy ounce and a half of animal charcoal,

boil the liquid for two minutes, filter while hot, and set it aside to crystallize. Should the liquid, before filtration, be entirely neutral, acidulate it very slightly with sulphuric acid. Should it, on the contrary, change the colour of litmus paper to a bright red, add more animal charcoal. Separate the crystals from the liquid, dissolve them in boiling distilled water slightly acidulated with sulphuric acid, add a little animal charcoal, filter the solution, and set aside to crystallize. Lastly, dry the crystals on bibulous paper, with a gentle heat, and keep them in a well stopped bottle.

The mother water may be made to yield an additional quantity of sulphate of quiniæ by precipitating the quinia with water of ammonia, and treating the precipitated alkaloid with distilled water, sulphuric acid, and animal charcoal as before." U. S.]

CINCHONIÆ SULPHAS, or Sulphate of Cinchonia ($C_{40}H_{24}N_2O_2$, HO, SO_3+2 HO), occurs in prisms, often of considerable size, requiring for solution about 6 parts of strong spirit and 54 parts of water: the solution is not fluorescent, and does not give the test with chlorine and ammonia.

QUINIDINÆ SULPHAS, or Sulphate of Quinidine ($C_{40}H_{24}N_2O_4$, HO, SO_3+6 HO), in acicular shining crystals, requiring 2 parts of spirit and 130 parts of water for solution; the solution is fluorescent, and gives the green colour with chlorine and ammonia.

CINCHONIDINÆ SULPHAS. Sulphate of cinchonidine ($C_{40}H_{24}N_2O_2HO, SO_3$) crystallizes in stellate groups of silky needles, soluble in water; the solution is fluorescent, but does not give the green colour when treated with chlorine and ammonia.

Besides the above salts, VALERIANATE OF QUINA (described under Valerian), CITRATE OF IRON AND QUININE (described under Iron Salts), and ARSENIATE OF QUININE are occasionally employed in medicine, but their special value is somewhat doubtful. The cinchona alkaloids also form with acids salts which are acid in reaction, and when the ordinary sulphates are administered, dissolved in excess of acid, as they usually are, such salts are produced.

Tartrates, *phosphates*, *citrates*, *tannates* of the cinchona alkaloids have been occasionally proposed as remedial agents; and the *hydrochlorate of cinchonine* has lately been employed in medicine.

Off. Prep.—Of the Yellow Cinchona Bark. DECOCTUM CINCHONÆ

Flavæ. Decoction of Yellow Cinchona Bark. (Yellow bark, in coarse powder, one ounce; distilled water, one pint, reduced to sixteen fluid ounces by boiling.) [A troy ounce of yellow Cinchona is boiled for fifteen minutes in a pint of water, strained, and enough water added through the strainer to make the decoction measure a pint. U. S.]

Extractum Cinchonæ Flavæ Liquidum. Liquid Extract of Yellow Cinchona. (Yellow cinchona bark, in coarse powder, one pound; distilled water, a sufficient quantity; rectified spirit, one fluid ounce, prepared by maceration, percolation, subsequent evaporation (at a temperature not exceeding 160°) to three fluid ounces, or until the specific gravity of the liquid is 1·2. When cold add the spirit. The specific gravity should be about 1·1.) Four fluid ounces represent one pound of the bark.

[Extractum Cinchonæ Fluidum. Fluid Extract of Cinchona. U. S. Yellow Cinchona, sixteen troy ounces; sugar, twenty troy ounces; diluted alcohol, a sufficient quantity. Four pints of tincture are obtained by percolation; this is evaporated by means of a water bath to two pints, the sugar added, the whole again evaporated to two pints and strained while hot.]

Infusum Cinchonæ Flavæ. Infusion of Yellow Bark. (Yellow cinchona bark, in coarse powder, half an ounce; boiling distilled water, ten fluid ounces.)

[Infusum Cinchonæ Flavæ. Infusion of Yellow Bark. U. S. Yellow Cinchona, in powder, a troy ounce; aromatic sulphuric acid, a fluid drachm; water, a sufficient quantity. The aromatic sulphuric acid is added to a pint of water. The powder, moistened with half a fluid ounce of the mixture, is percolated with the remainder of it, and afterwards with water, until the filtered liquid measures a pint.]

[Infusum Cinchonæ Rubræ. Infusion of Red Cinchona. U. S. The same as Infusum Cinchonæ Flavæ.]

Tinctura Cinchonæ Flavæ. Tincture of Yellow Bark. (Yellow cinchona, in coarse powder, four ounces; proof spirit, one pint. Prepared by maceration and percolation.)

[Tinctura Cinchonæ. U. S. Two pints of tincture are prepared by percolating six troy ounces of yellow bark, with diluted alcohol so as to obtain two pints of tincture.]

Of the Pale Bark. TINCTURA CINCHONÆ COMPOSITÆ. Compound Tincture of Cinchona. (Pale cinchona bark, in coarse powder, two ounces; bitter orange peel, cut small and bruised, one ounce; serpentary, bruised, half an ounce; saffron, sixty grains; cochineal in powder, thirty grains; proof spirit, one pint. Prepared by maceration and percolation.)

[Tinctura Cinchonæ Composita. U. S. Red Cinchona in moderately fine powder, four troy ounces; orange peel, in powder, three troy ounces; serpentaria, in powder, three hundred and sixty grains; saffron, in powder, red saunders, in powder, each one hundred and twenty grains. Percolated with diluted alcohol so as to form two and a half pints of tincture.]

Of Quinia. TINCTURA QUINIÆ COMPOSITA. Compound Tincture of Quinine. [Not officinal in U. S. P.] (Sulphate of quinia, one hundred and sixty grains; tincture of orange peel, twenty fluid ounces.) One fluid drachm contains a grain of sulphate of quinia.

Therapeutics. Cinchona barks owe their efficacy chiefly to the alkaloids contained in them, but some influence is also exercised by the cincho-tannic acid and red cinchonic, which produce a slight difference of action between the barks and the alkaloids derived from them. Given in small doses, bark causes an increase of appetite, especially in weak patients, and at the same time improves the condition of the muscular and nervous systems; hence the improvement of the blood and general health; it may, therefore, be well designated a tonic. Its power in bracing up the system is also seen in the check given to the colliquative sweating occurring in extreme debility. Bark also produces a peculiar influence upon the nervous system, which is exhibited in the extraordinary power which it possesses of arresting the progress of certain diseases, characterised by a periodical recurrence of their symptoms, as ague, the different forms of neuralgia, and certain inflammatory affections: how this effect is produced is at present unknown. Bark acts likewise as an astringent, and this property, combined with the tonic and anteperiodic powers, is often of much therapeutic value.

In large doses bark causes disagreeable, and sometimes serious symptoms, as thirst, loss of appetite, nausea, and even vomiting, headache, throbbings in the head, noise in the ears, and occasionally deafness and coma.

Bark may be advantageously employed in many diseases.

In *atonic dyspepsia*, as a stomachic, bark is most valuable in cases where the indigestion results from a want of tone in the general system, such as occasionally occurs in the convalescence from acute diseases, and in some forms of gastrodynia of a neuralgic and intermittent character.

In *atonic conditions of the general system*, as a tonic, to improve the tone of the muscles, check too great perspiration and abnormal mucous discharges if present: it is useful also in *scrofula* and other forms of *cachexia*, and in *gangrene* arising from want of tone in the habit; also in some low forms of *chronic inflammation*.

It is, however, in *intermittent fevers* that its efficacy is most strongly marked, and perhaps no remedy in the list of the Materia Medica has obtained such repute in the treatment of these fevers. Bark may be given in two ways; either in a very large dose, a short time before the expected paroxysm, or in small doses, frequently continued, during the whole of the interval between the paroxysms: sometimes the first method is at once effectual, but there is some fear of producing unpleasant symptoms from the amount of the dose; the second method is also, as a rule, quite successful, and without hazard.

Bark has been found useful in all the different varieties of quotidian, tertian and quartan *agues*, and also in the *remittent fevers* occurring in hot and damp climates, as on some parts of the coast of Africa, &c. In *continued fevers* its value is questionable.

Externally bark acts as an astringent and antiseptic: it is sometimes made use of as an application to unhealthy ulcers, sprinkled in the form of powder on the part, also in the form of gargle in putrid sore throats, and applied to spongy gums as a dentifrice.

Action of the Cinchona Acids.

Cinchotannic acid and *red cinchonic* produce the same astringent effects upon the system as tannic and gallic acids.

The action of *kinic* and *kinovic* acids is unknown.

Action of the Cinchona Alkaloids.

Quinia, or any salt of this alkaloid, produces all the effects of yellow cinchona bark, except that it is not astringent; it may

be given in all cases where bark is indicated—generally with some advantage over bark itself, on account of the smallness of the dose required, and its little liability to disturb the stomach; the only exceptions would be, cases of great debility of the system, with excessive weakness of the circulation and increased secretions; in these the pharmaceutic preparations of cinchona barks appear at times to be preferable.

Cinchonia is generally supposed to have a similar action to quinia, differing only in degree, being regarded as much weaker: that it possesses antiperiodic powers is undoubted, whether equal to quinia, or not, requires still to be determined. The author has had abundant evidence to prove that peculiar effects often result from cinchonia salts, which are not produced by the same amount of the corresponding salts of quinia.

Quinidine appears to act in the same way as quinia, but whether equal in power has not yet been determined.

Cinchonidine probably acts in the same manner as cinchonine, but a further investigation of its powers is required.

Action of the different kinds of Cinchona Barks.

No very well marked difference in the action of the different barks has yet been established: there can be no doubt, however, that their effects depend on the alkaloids contained in them, and consequently any peculiarity of the bark would be that of the prevailing alkaloid.

As a rule, quinia exists in large quantities in yellow bark, cinchona in pale barks, and the red bark is stated to contain about equal amounts of the two alkaloids. Quinidine and cinchonidine are more especially found in the Carthagena barks. According to the results of recent examinations, collected in the form of a table by the late Dr. Pereira,

Yellow or Calisaya barks yield from 2·5 to 3·8 per cent. of quinine;

Pale or Loxa barks, from about 0·7 to 1·4 per cent. of alkaloids chiefly cinchonine or quinidine, with a little quinine;

Best red barks, 2·6 per cent. of quinine, and 1·5 per cent. of cinchonine;

Gray or Huanuco barks, from 1·7 to 2·1 per cent. of alkaloids,

chiefly consisting of cinchonine and quinidine, with occasionally some quinine.

Dose. Of any cinchona bark, in powder, 10 gr. to 60 gr.; of the decoction 1 fl. oz. to 2 fl. oz.; of the infusions, 1 fl. oz. to 2 fl. oz.; of the liquid extract of yellow cinchona, 10 min. to 1 fl. drm; of the tinctures (simple or compound), 1 fl. drm. to 2 fl. drm.; of sulphate of quinine, 1 gr. to 10 gr., or even 20 gr.; of compound tincture of quinine, 1 drm. to 2 drm.; of sulphate of cinchonine, 1 gr. to 10 gr.; of sulphate of quinidine 1 gr. to 20 gr.; of sulphate of cinchonidine, 1 gr. to 10 gr.; of hydrochlorate of cinchonine 1 gr. to 10 gr.

In intermittents, or when the dose of bark is required to be large, the salts of quinia or cinchonia are preferred; powdered bark was formerly given in such cases, but it is apt to disagree with the stomach, and cause nausea and vomiting; the liquid extract might be made use of, but their strength is by no means equivalent to the amount of bark made use of in their preparation, and the same holds good of all the pharmaceutic preparations made with water, the solvent powers of that fluid being unequal to abstract all the principles from the bark.

Adulteration of Cinchona Barks. Inferior non-officinal cinchona barks may be substituted for the officinal, and barks of other species may be sold for those of the genus cinchona; these are distinguished by their physical characters, and by finding the presence and amount of the cinchona alkaloids contained in them. The structure of the bark also affords some test of its value, for it has been found that the bark which exhibits when fractured a homogeneous texture, with a large amount of short fusiform ligneous fibres, uniformly distributed in the cellular tissue, contains a large amount of quinine; this is the character of true Calisaya barks. Barks rich in quinine generally contain much lime, and the strong infusions are precipitated by sulphate of soda; which is not the case with the barks yielding cinchonine. The same holds good with regard to the amount of tannin. Many methods of ascertaining the per-centage of alkaloids have been proposed; the following is the method given in the Pharmacopœia for the examination of yellow cinchona bark:—One hundred grains of the bark are reduced to powder and thoroughly exhausted by

maceration and percolation, with water acidulated with hydrochloric acid. To this solution, subacetate of lead is added until all the colouring matter is removed, care being taken to keep the fluid acid. The precipitate is removed by filtration, and to the filtrate caustic potash, enough to redissolve the precipitate which is at first formed, is added, and the solution then well shaken with successive quantities of ether, until a drop of the ether evaporated to dryness yields no perceptible residue. The ethereal solutions are then evaporated to dryness, and the residue, which consists of nearly pure quinia and should be readily soluble in dilute sulphuric acid, is weighed. Pale and red barks are tested in a similar manner, with the substitution of chloroform for ether in the process.

Of Sulphate of Quinine. On account of the high price of this salt, many adulterations have been practised. *Sulphates of cinchonine, quinidine, and cinchonidine, salicine, sugar of milk, cane sugar, mannite, starch,* and *stearic acid,* form the most frequent organic adulterations; and *sulphate of lime,* precipitated to imitate the quinia salt, *chalk, magnesia,* and *boracic acid,* are among the most frequent inorganic additions. These latter, with the exception of boracic acid, are readily detected by their not dissolving in alcohol, and by heating the suspected salt on a piece of platinum foil, where they leave an ash, the nature of which can be ascertained by the ordinary tests: the organic impurities are more difficult of detection; cinchonine, cinchonidine and quinine can be discovered by their different solubilities in water, alcohol, and ether; salicine, by the blood-red colour produced by sulphuric acid; the sugars, by the solution of the salt, after the precipitation of the alkaloids by means of an alkali, being sweet; starch, by its striking blue with iodine; and stearic acid, by not dissolving in dilute acids. Boracic acid, if present, gives to its alcoholic solution the property of imparting a green tinge to flame. The British Pharmacopœia gives the following quantitative test: —Ten grains with ten minims of diluted sulphuric acid and half a fluid ounce of water form a perfect solution, from which ammonia throws down a white precipitate. This redissolves on agitating the whole with half a fluid ounce of pure ether, without the production of any crystalline matter floating on the lower of the two strata, into which the agitated fluid separates on rest. The upper

stratum of fluid, if entirely removed by a pipette and evaporated leaves a white residue, which, when dried in the air without heat, weighs 8·6 grains.

Ipecacuanha. Ipecacuan or Ipecacuanha. The dried root Cephaelis ipecacuanha; Lin. Syst., Pentandria monogynia; growing chiefly in the Brazils, and sent from Rio Janeiro.

Description. *Annulated* or Brazilian ipecacuan, as it is named to distinguish it from another kind, called *striated* or Peruvian ipecacuan, the produce of Psychotria emetica, is in the form of contorted pieces, from two to four inches in length, about the size of a small quill, knotted, having very deep circular fissures extending down to the woody axis or meditullium, and giving the appearance of a series of brownish or ash-coloured rings, strung on a white cord. The odour of ipecacuanha is slight, but disagreeable; the taste bitter, aromatic, and slightly acrid: it breaks easily, with a resinous fracture. The active ingredients chiefly reside in the cortex. The powder of ipecacuan is pale brown.

Prop. & Comp. Ipecacuan contains a feeble alkaloid, *emetina* (C_{35} H_{25} NO_9 ?), separable as a whitish or yellowish amorphous powder, of a bitter taste, soluble in alcohol, sparingly so in water and ether, and precipitated by tannin; also a peculiar acid, *cephaelic* or *ipecacuanha acid*, allied to catechin, formerly thought to be gallic acid, and striking green with the persalts of iron; gum, starch, fatty or oily matter, are also present in the root. Water, spirit, and wine take up the active part, namely, the salt of emetina.

Off. Prep. Pulvis Ipecacuanhæ cum Opio. Powder of Ipecacuan and Opium; formerly Compound Ipecacuanha Powder; Dover's powder. (Powdered ipecacuan, half an ounce; powdered opium, half an ounce; powdered sulphate of potash, four ounces.) One grain of opium and one of ipecacuan are contained in ten grains of this powder.

Trochisci Morphiæ et Ipecacuanhæ. Morphia and Ipecacuana Lozenges. [Not officinal in U. S. P.] (Hydrochlorate of morphia, twenty grains; ipecacuan, in fine powder, 60 gr.; tincture of Tolu, sugar, gum arabic, and water, to form a mass to be divided into seven hundred and twenty lozenges. Each lozenge contains $\frac{1}{360}$ grain of morphia salt, and $\frac{1}{12}$ grain of ipecacuan.)

[Trochisci Ipecacuanhæ. Troches of Ipecacuanha. U. S. Ipecacuanha, half a troy ounce; arrow root, four troy ounces; sugar, fourteen troy ounces; mucilage of tragacanth, a sufficient quantity. To be made into a mass and divided into troches, each weighing ten grains. Each troche contains ¼ of a grain of Ipecacuanha.]

Vinum Ipecacuanhæ. Ipecacuanha Wine. (Bruised ipecacuan, one ounce; sherry wine, twenty fluid ounces. Prepared by maceration.) [U. S. A troy ounce to a pint. Prepared by percolation.]

Therapeutics. Ipecacuan in large medicinal doses acts as an emetic, not so speedy as sulphate of zinc or mustard; at the same time it is more depressing, but less so, however, than tartar emetic: in smaller doses, short of inducing either nausea or vomiting, it becomes absorbed and acts upon the different mucous surfaces, especially of the respiratory passages and of the alimentary canal, and is, therefore, expectorant, and sometimes laxative; it also acts upon the skin as a diaphoretic. Ipecacuan is well suited for an *emetic* in chest affections accompanied with fever, as in bronchitis, phthisis, and croup, in which the after-expectorant effect is of great service; also to unload the stomach in dyspepsia when of an inflammatory character. As an *expectorant*, it is used in the various forms of bronchitic disease; on account of its action on the alimentary canal, it is of value in chronic dysentery and diarrhœa, for which it was at one time held in great estimation; it is also at times a useful adjunct to purgative medicines. As a *diaphoretic*, in the form of Dover's powder, it is frequently employed in catarrhal affections; the combination with opium appears to increase its sudorific action.

Ipecacuan has also been given in agues before the paroxysm, to prevent or cut it short; and, on account of the *sedative* effect on the vascular system which follows the nausea, in hæmorrhages of various kinds. Some individuals are peculiarly susceptible of the influence of ipecacuan, the effluvia from the powdered drug being sufficient to cause sneezing, cough, and a species of asthma.

Dose. Of ipecacuan (powdered) as an *emetic*, 15 gr. to 30 gr.; as an *expectorant*, &c. ¼ gr. to 2 gr.; of vinum ipecacuanhæ, as an *emetic*, 3 fl. drm. to 6 fl. drm.; as an *expectorant*, 5 min. to 40

min. The dose of pulv. ipecacuanhæ cum opio depends on the amount of opium desirable to administer rather than on the quantity of ipecacuan.

Adulteration. Striated ipecacuan above alluded to, and other roots, have occasionally been mixed with or substituted for ipecacuan.

Caffeine or **Theine** (not officinal), a principle obtained from coffee, or the berry of Caffea arabica, a plant belonging to the order Cinchonaceæ, contained also in tea from Thea viridis, &c., and Paraguay tea from Ilex paraguensis, likewise in Paulinia sorbilis, and other plants, used by different nations to form beverages.

When pure, *Caffeine* or *Theine* forms beautiful silky prisms, soluble in water, alcohol, and ether; it is precipitated by tannin, and sublimes when heated. Composition ($C_{16}H_{10}N_4O_4 + 2HO$).

Given internally, caffeine or a strong infusion containing it acts powerfully upon the nervous system, producing restlessness, palpitation of the heart, and other nervous symptoms. Caffeine also appears to possess the power of checking, in some measure, the changes or metamorphoses of the animal body, shown by the diminished formation of urea, which takes place under its employment. Coffee and caffeine may be given to relieve stupor from the use of opium or other narcotics, in nervous headaches, also to arrest the paroxysms of spasmodic asthma, in hooping-cough, and in some forms of intermittent affections. The action of caffeine requires further investigation, as in the infusions of coffee and tea a part of the influence may be due to the other constituents which are present.

Pale Catechu, described under *Catechu*, is derived from *Uncaria gamba*, a tree belonging to this order.

VALERIANACEÆ.

Valeriana. Valerian. The root of Valeriana officinalis, dried; Lin. Syst., Triandria monogynia; indigenous and cultivated; the wild plant growing on dry soils is to be preferred.

Description. As met with, it consists of a short rhizome, with numerous radicles two or three inches long; of a light yellowish brown colour, a strong characteristic and disagreeable odour, and a bitter, acrid, camphoraceous, and nauseous taste.

Prop. & Comp. Valerian root owes its activity to a *volatile oil* and *valerianic acid;* resinous, extractive, and gummy matters are also present. The volatile oil of valerian, sp. gr. 0·94, has a light greenish colour, and the odour of valerian; it consists of valerole, and a hydrocarbon, borneéne.

Valerole (C_{12} H_{10} O_2) is a crystalline body at a low temperature; it forms a blood-red solution with sulphuric acid, and when exposed to the air, gradually absorbs oxygen, acquires a peculiar strong odour, and is converted into valerianic acid.

Borneéne is a hydrocarbon identical with that found in Borneo camphor (C_{20} H_{16}).

Valerianic acid (HO, C_{10} H_9 O_3) can be procured in small quantities from valerian root by distillation with very dilute sulphuric acid; it is an oily liquid, sp. gr. 0·9, with the intense odour of valerian; it forms salts with the metallic bases, most of which are crystalline. This acid can also be formed, and much more economically, by the oxidation of Fousel oil or amylic alcohol.

Off. Prep.—Of Valerian. Infusum Valerianæ. Infusion of Valerian. (Valerian, bruised, one hundred and twenty grains; boiling distilled water, ten fluid ounces.) [Valerian in moderately coarse powder, half a troy ounce. Prepared by percolating with cold water until the filtered liquid measures a pint; or by macerating the valerian with a pint of boiling water for two hours and straining. U. S.]

Tinctura Valerianæ. Tincture of Valerian. (Valerian, bruised, two ounces and a half; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.) [Two pints of tincture are prepared by percolating four ounces of valerian with diluted alcohol. U. S.]

Tinctura Valerianæ Ammoniata. Ammoniated Tincture of Valerian. (Valerian, bruised, two ounces and a half; aromatic spirit of ammonia, twenty fluid ounces. Prepared by maceration.) [Valerian in moderately fine powder, four troy ounces; aromatic spirits of ammonia, two pints. Prepared by maceration. U. S.]

Therapeutics. Valerian acts as a stimulant, and powerful antispasmodic, and is peculiarly adapted for the treatment of the various symptoms occurring in hysterical subjects, as spasm

hemicrania, globus, palpitation, &c.; it has also been found useful in some cases of chorea, epilepsy, hypochondriasis, and, as an adjunct to tonics, in intermittents.

Dose. Of valerian in powder, 15 gr. to 30 gr.; of infusum valerianæ, 1 fl. oz. to 2 fl. oz.; of tinctura valerianæ, 1 fl. drm. to 2 fl. drm.; of tinctura valerianæ ammoniata, ½ fl. drm. to 1½ fl. drm.

Valerianate of Soda. Appendix.

Prep. Prepared by distilling Fousel oil with a mixture of sulphuric acid and bichromate of potash, and saturating the distilled fluid with soda. In this process Fousel oil, which is the alcohol of the amyl series, and is represented by the formula C_{10} H_{11} O, HO, undergoes oxidation by the chronic acid which is set free when the sulphuric acid is mixed with bichromate of potash, and is converted into valerianic acid, which distils over. This acid bears the same relation to Fousel oil, as acetic acid does to ordinary alcohol, or formic acid to wood spirit or methylic alcohol. The fluid containing the valerianate of soda is evaporated to dryness and the valerianate is fused and allowed to cool.

Prop. & Comp. It is presented in dry white masses, not alkaline in reaction, evolving an odour of valerian when sulphuric acid is added. Its composition is represented by the formula NaO, C_{10} H_9 O_3.

Therapeutics. Valerianate of soda seems to resemble valerian in its action, and may be used in cases where the administration of valerian is desirable. It is introduced into the British Pharmacopœia for manufacturing the valerianate of zinc.

Dose. ½ gr. to 2 gr. or more.

Zinci Valerianas. Valerianate of Zinc.

Prep. Prepared by mixing a solution of sulphate of zinc and valerianate of soda, and separating and purifying the crystals which are formed.

Prop. & Comp. This salt occurs in pearly crystalline scales, with an odour and taste of valerianic acid; soluble in alcohol and hot water; sparingly so in cold water and ether. Composition (Zn O, C_{10} H_9 O_3). Heated to redness in an open crucible it

leaves a residue of oxide of zinc, soluble in dilute sulphuric acid, and the solution is precipitated white by hydrosulphuret of ammonia. This salt has been frequently adulterated, especially with sulphate of zinc; to show the absence of this latter salt, the solution of valerianate of zinc in hot water should give no precipitate with chloride of barium. When valerianate of zinc is distilled with dilute sulphuric acid, the distillate (valerianic acid) when mixed with a solution of acetate of copper, should not immediately affect the transparency of the fluid, but form after a little time oily drops, passing gradually into a bluish-white crystalline deposit: this shows the absence of butyric acid (the butyrate of zinc is a common adulteration of the salt as found in commerce).

Therapeutics. Valerianate of zinc is a nervine tonic and antispasmodic, and has been given with advantage in cases where the combined action of the mental and valerian seems desirable, as in chorea, epilepsy, and various neuralgic affections; it is said also to act as an anthelmintic.

Dose. ½ gr. to 4 gr.; the dose may be increased till some nausea is produced.

Valerianate of Quinia. ($C_{40}\,H_{24}\,N_2\,O_4$, $C_{10}\,H_9\,O_3$+2 HO) forms white silky needles, with a strong odour and taste; soluble in alcohol, and sparingly so in water, especially when cold; it is decomposed by heat with the escape of valerianic acid.

Therapeutics. It is sometimes employed in medicine, but is not officinal. It is said to be particularly useful in some forms of intermittent and spasmodic neuralgic affections.

Dose. 1 gr. to 5 gr.

Valerianate of iron, and *valerianate of ammonia* have also been used in medicine, and may be given in the same doses as the corresponding salt of zinc.

COMPOSITÆ.

Inula. Elecampane. (Not officinal.) [Officinal in U. S. P.] The root of Inula helenium; Lin. Syst., Syngenesia superflua; indigenous, growing in damp meadows.

Description. A thick elongated root, brown externally, but light yellow within, having an aromatic odour and taste.

Prop. & Comp. Contains a peculiar camphor-like body, *helenine* (C_{15} H_{10} O_2), crystallizing in white needles; insoluble in water; a *bitter extractive*, soluble in water; a peculiar starch, striking yellow with iodine, called *inulin* (C_{24} H_{21} O_{21}). Formerly it entered as an ingredient into the confection of pepper.

Therapeutics. Stimulant; thought to be tonic, expectorant, and diaphoretic. Seldom used now, was formerly given in the exanthemata, coughs, &c.

Dose. Of the powdered root, 30 gr. to 60 gr., and upwards.

Pyrethrum. Pellitory. (Not officinal.) [Officinal in U. S. P.] The root of Anacyclus pyrethrum, or Pellitory of Spain; Lin. Syst., Syngenesia superflua; growing in Barbary, Spain, and the Levant.

Description. A fusiform root, cut into cylindrical pieces two or three inches long, dark brown in colour, spotted black.

Prop. & Comp. It contains at least two *resins*, one of which has been named *pyrethric* acid; an *acrid oil*, and tannin.

Therapeutics. A topical irritant, causing pricking in the mouth and a flow of saliva and buccal mucus; it is used as a masticatory in paralysis of parts about the mouth.

Absinthium. Wormwood. (Not officinal.) [Officinal in U. S. P.] The flowering herb of Artemisia absinthium; Lin. Syst., Syngenesia superflua; indigenous, growing in thickets and mountainous places.

Description. It occurs in bundles of the dried herbs, having a silky touch, disagreeable odour, and intensely bitter taste.

Prop. & Comp. The plant yields its bitterness to water and spirit, and contains a *volatile oil* (C_{20} H_{16} O_2), green in colour, with the odour of the plant, also a bitter extract yielding *absinthine* (C_{16} H_{11} O_5), and absinthic acid. The absinthine is the bitter principle.

Therapeutics. A powerful bitter stomachic and tonic, useful in atonic dyspepsia; it is also reputed to be anthelmintic. It has been lately asserted that the long continued use of absinthe, in the

shape of bitters, has an injurious effect upon the nervous system. Wormwood is largely used on the Continent in this form.

Dose. Of the powder, 20 gr. to 40 gr. It may be infused with advantage (1 oz. to 20 fl. oz.), of which 1 fl. oz. to 2 fl. oz. may be given. It strikes blue with iron salts.

Santonica. Santonica. The unexpanded flower heads of undetermined species of Artemisia. [Of Artemisia contra and other species of Artemisia. U. S.]

Santoninum. Santonin. A crystalline neutral principle obtained from santonica.

Description. The flower heads, which resemble seeds in appearance, are nearly half a line in breadth, and more than a line long, fusiform, blunt at the ends, greenish brown in colour, smooth, not hairy, formed of umbricated involucral scales, with a green midrib enclosing four or five tubular flowers; strong odour, bitter camphoraceous taste.

Prop. & Comp. Santonica contains traces of volatile oil and a crystallizable substance *santonin*, which occurs in brilliant, white, four-sided, flat prisms, tasteless, or feebly bitter, odourless; scarcely soluble in cold water, sparingly in boiling water, but abundantly in chloroform, and boiling rectified spirit; soluble also in ether; not dissolved by dilute mineral acids; fusible, and sublimes at a moderate heat; the crystals become yellow by exposure to light; it has the nature of a crystalline resin with slight acid properties; nitric acid converts it into succinic acid, formula $C_{30}\,H_{18}\,O_6$.

Prep. Santonin is prepared by boiling bruised santonica for some time with water and lime, straining and reducing the bulk of the solution by evaporation. To this, while still hot, hydrochloric acid is added, until the liquid becomes slightly and permanently acid, and it is then set aside for the precipitate which forms to subside. The oily matter floating on the surface is removed by skimming, and the fluid decanted off from the precipitate, which is collected on filtering paper, washed first with cold distilled water, then with solution of ammonia, and again with water, till the washings are colourless. The precipitate is then dried at a gentle heat; purified by redissolving in boiling spirit with a little

animal charcoal, filtering, and setting aside the liquid in a dark place to allow crystals of santonin to deposit.

Therapeutics. The action is anthelmintic, and it forms a pleasant vermifuge for children. It is stated to be especially useful in the treatment of the lumbricus, or round worm.

Dose. Of santonica or worm seed, from 60 gr. to 120 gr. Seldom used in this form. The dose of santonin is from 1 gr. to 3 gr. for a child; 3 gr. to 6 gr. or more for an adult.

Anthemis. The flower of Anthemis nobilis, or Common Chamomile; Lin. Syst., Syngenesia superflua; indigenous, growing in pastures on gravel, and cultivated.

Anthemidis Oleum. English oil of Chamomile. The oil distilled in England from the flower.

Description. The *flowers* may be either single or double, consisting of a yellow convex disk and white rays; the florets of the ray are numerous, white and three-toothed; those of the disk, yellow; by cultivation many of the latter are converted into white ray florets, and the flower is then said to be double. The single variety consists of yellow tubular and white strap-shaped florets; the double, of white strap-shaped florets only.

Prop. & Comp. The flowers contain a *volatile oil*, and a bitter *extractive matter*. The oil is of a pale blue or greenish colour, becoming yellowish by age; it has the peculiar odour and aromatic taste of the flowers; sp. gr. 0·91; it probably is a mixture of a hydrocarbon (C_{20} H_{16}), the real volatile oil, with an oxidized substance, which when treated with potash is converted into angelate of potash (KO, C_{10} H_7 O_3),

Off. Prep.—Of the Flowers. Infusum Anthemidis. Infusion of Chamomile. (Chamomile flowers, half an ounce; boiling distilled water, ten fluid ounces.) [Chamomile flowers, half a troy ounce, boiling water a pint. U. S.]

Of the Flowers and Oil.

Extractum Anthemidis. Extract of Chamomile. (An infusion of the flowers evaporated, and having a subsequent addition of fifteen minims of the oil for each pound of flowers employed.)

Therapeutics. Chamomile is an aromatic stomachic and tonic; in large doses, especially in the form of a warm infusion, it acts as an emetic; it is used in atonic dyspepsia, also to assist the action of emetics. It is thought to be an antiperiodic. The oil is stimulant and carminative, a useful adjunct to purgatives.

Dose. Of the infusion, 1 fl. oz to 4 fl. oz.; of the oil 1 min. to 5 min.; of the extract, 3 gr. upwards. The extract forms a useful adjunct to stomachic and other pills.

Taraxacum. Dandelion Root. The recent root of Taraxacum Dens leonis or Common Dandelion; Lin. Syst., Syngenesia æqualis, indigenous; gathered between September and February from meadows and pastures in Britain.

Description. The root is tapering and branched, yielding a bitter milky juice when cut, which becomes brown by exposure; smooth and dark; of a brown colour externally, white within; of a sweetish bitter taste; the juice should not be watery, nor the root wrinkled or pale externally, and any adherent leaves runcinate and smooth.

Prop. & Comp. The juice contains resinous matters, sugar, gum, and a *bitter extractive*, from which a crystalline principle named *taraxacine* has been obtained, bitter in taste; soluble in alcohol, ether, and hot water, sparingly so in cold. *Mannite* has been also extracted, but whether it is a product of the fermentation of the juice or exists in the root is as yet undecided.

Off. Prep. Decoctum Taraxaci. [Not officinal in U. S. P.] Decoction of Taraxacum. (Dried dandelion root, one ounce; distilled water, thirty fluid ounces, reduced by boiling to twenty ounces.)

Extractum Taraxaci. Extract of Taraxacum. (Prepared as the other extracts, from the expressed juice.)

Succus Taraxaci. Juice of Taraxacum. [Not officinal in U. S. P.] (The juice expressed from the dandelion root, to every three measures of which one measure of rectified spirit is added.)

[Extractum Taraxaci Fluidum. Fluid Extract of Dandelion. Three pints of tincture are obtained by percolation from sixteen troy ounces of Dandelion root, and reduced by evaporation to sixteen fluid ounces.]

Therapeutics. The value of Taraxacum as a remedy is a matter which admits of some doubt. It is supposed to have a specific action on the liver, modifying and increasing its secretion; hence its widely spread use in hepatic diseases, more particularly when attended with an habitually engorged state of the vessels of that viscus. Given for some time, it is thought to act as an alterative on that organ. In dropsies from hepatic obstruction, it is generally administered in combination with a purgative.

Dose. Of decoctum taraxaci, 1 fl. oz. to 2 fl. oz.; of extractum taraxaci, 10 gr. to 30 gr. or more; of succus taraxaci, ½ fl. drm. to 2 fl. drm. or more.

Lactuca. (Not officinal.) The flowering plant of Lactuca sativa, the Garden-Lettuce; Lin. Syst., Syngenesia æqualis, indigenous.

Lactucarium. (Not officinal.) [Officinal in U. S. P.] The inspissated juice of Lactuca sativa and of Lactuca virosa, the Wild Lettuce.

Description. The lettuce is too familiar to need description. *Lactucarium*, which is prepared by pressing out the milky juice of the flowering herbs and afterwards inspissating with a gentle heat, occurs in small masses or lumps of a brown colour, with an odour very similar to opium, and a bitter taste. It is obtained in much larger quantities from L. virosa than from L. sativa.

Prop. & Comp. Lactucarium yields to alchol a bitter extractive matter; it is also sparingly soluble in water. A crystalline substance, *lactucerine* ($C_{40}H_{34}O_5$), soluble in alcohol and ether, but not in water, has been extracted from lactucarium, forming 42 per cent. of the fresh drug; and two other substances, *lactucic* acid and *lactucine*, soluble in water, the latter being crystalline and resembling *mannite*.

Therapeutics. The lettuce has been asserted to possess some narcotic powers, and has been occasionally eaten at bed-time to induce sleep. Extract of the fresh juice and lactucarium are generally employed by the physician, and have been prescribed, in cases in which opium disagrees with the patient, to procure sleep, allay cough, &c. Lettuce has certainly very feeble powers compared with opium, and the author has given 30 grains and more of good lactucarium without noticing any decided narcotic effect from its administration.

Dose. Of lactucarium, or extract of lettuce made from the juice, 5 gr. to 30 gr.

Arnica. The root [The flowers. U. S.] of Arnica montana; Lin. Syst., Syngenesia superflua; found in the mountainous parts of Europe.

Description. The rootstock from 1 to 3 inches long, and 2 or 3 lines thick, cylindrical, contorted, rough from the scars of the coriaceous leaves, and furnished with numerous long slender fibres. The flowers of arnica are of a dark yellow colour, calyx green; the ray florets ligulate, much longer than the calyx; the florets of the disc tubular.

Prop. & Comp. The flowers, the leaves, and root of this plant, all of which are often employed, have a peculiar odour when fresh, and are apt to excite sneezing. The active properties are taken up by water. In addition to the other constituents of plants, arnica contains a *volatile oil* and a bitter principle identical with *cytisin:* a *volatile alkaloid*, resembling lobelina, has also been procured from it.

Tinctura Arnicæ. Tincture of Arnica. (Arnica root, in fine powder, one ounce; rectified spirit, one pint. Prepared by maceration and percolation.) [Two pints of tincture are made from six troy ounces of arnica flowers, by percolation with diluted alcohol. U. S.]

Therapeutics. Given internally, arnica acts as a stimulant and irritant: it has been supposed to influence the spinal cord; its action upon the system has not, however, been satisfactorily made out. It is chiefly employed as an external application for the discussion of tumours, and for sprains and bruises. The author has reasons for questioning the virtues of arnica as a remedy in these cases.

Dose. Externally, the tincture is employed either alone or diluted with water, or added to liniments.

LOBELIACEÆ.

Lobelia. Lobelia. The flowering herb of Lobelia inflata, Indian Tobacco; Lin. Syst., Pentandria monogynia; indigenous in the United States.

Description. The whole herb is officinal; stem angular; leaves alternate, ovate, toothed; somewhat hairy beneath; capsule ovoid, inflated, ten-ribbed; herb acrid. It is generally found in oblong, compressed cakes.

Prop. & Comp. It has a peculiar odour, and a burning taste, not observed for a short time after the substance has been chewed. Besides colouring matters and the common constituents of plants, it contains a volatile oil or peculiar acid, the *lobelic acid*, and an alkaline principle, *lobelina*. This substance forms a yellowish liquid, lighter than water, very soluble in ether and alcohol, and forms crystalline salts with the mineral acids; it is probably the active agent of the plant.

Off. Prep. TINCTURA LOBELLÆ. Tincture of Lobelia. (Lobelia, dried and bruised, two ounces and a half; proof spirit, one pint. Prepared by maceration and percolation.) [U. S. Two pints of tincture are obtained by percolation from four troy ounces of powdered Lobelia.]

TINCTURA LOBELLÆ ÆTHEREA. Ethereal Tincture of Lobelia. [Not officinal in U. S. P.] (Lobelia, dried and bruised, two ounces and a half; spirit of ether, one pint. Prepared by maceration.)

Therapeutics. In small doses it is expectorant and diaphoretic; in larger, emetic or cathartic. In too large quantities it produces much depression, nausea, cold sweats, and even death, preceded by convulsions; it closely resembles tobacco in its action. It has been much lauded in attacks of spasmodic asthma, and also in other affections of the air-passages, attended with dyspnœa. In some cases it forms a useful adjunct to diuretics.

Dose. Of the tincture or ethereal tincture, 10 min. to ½ fl. drm. or more, carefully watching any symptom of vascular depression.

PYROLACEÆ.

Chimaphila. Winter Green. (Not officinal.) [Officinal in U. S. P.] The herbaceous part of Chimaphila Umbellata or Umbelled Winter Green, called also Pyrola; Lin. Syst., Decandria monogynia; growing in North America.

Description. The leaves are cuneate, lanceolate, coarsely serrated, coriaceous, smooth and shining; green, when fresh; when

dry, yellowish-brown. The flowers form small pinkish-white corymbs.

Prop. & Comp. The fresh plant is fragrant when bruised; when dry, the odour is not unlike tea; taste, astringent and bitter; it yields a bitter *extractive matter*, tannin, and perhaps a trace of gallic acid. No crystalline principle has been discovered in it.

Therapeutics. Tonic astringent, and diuretic; occasionally used in catarrhal affections of the bladder, also stated to be useful as a diuretic in albuminuria and dropsies; it has likewise been employed in scrofula and rheumatism.

Dose. Of the decoction, 1 fl. oz. to 2 fl. oz. (made with 1 oz. of the leaves in the 20 fl. oz. of decoction.)

ERICACEÆ.

Uva Ursi. Bearberry. The leaf of Arctostaphylos Uva Ursi. Whortleberry, Bear-berry or Trailing Arbutus; Lin. Syst., Decandria monogynia; growing in the Northern parts of Europe and America.

Description. The leaves are dark green, obovate, obtuse, entire, shining on upper surface, reticulated underneath, coriaceous in consistence, about three-fourths of an inch in length. Not dotted beneath nor toothed on the margin.

Comp. & Prop. Taste astringent, odour like hay or tea; the infusion giving a bluish black precipitate with perchloride of iron. Contains *tannin* about 35 per cent., with a trace of gallic acid, bitter extractive, &c.

Off. Prep. INFUSUM UVÆ URSI. Infusion of Bearberry. [Not officinal in U. S. P.] (Bearberry leaves, half an ounce; boiling distilled water, ten fluid ounces.) [Extractum Uvæ Ursi Fluidum. Fluid Extract of Uva Ursi. U. S. Sixteen fluid ounces of extract are made from sixteen troy ounces of Uva Ursi by percolation with diluted alcohol. Evaporation of the tincture, and the addition of eight ounces of sugar.]

Therapeutics. An astringent and diuretic, used in vesical and urethral affections, as catarrhus vesicæ (chronic), to diminish irritability and mucous discharge, also in gleets; sometimes employed in kidney affections; it may be given with alkalies or acids.

Dose. Of powder, 10 gr. to 30 gr.; of the infusion, 1 fl. oz. to 2 fl. oz. [Of the fluid extract, 20 min. to 1 fl. drm.]

Adulteration. Leaves of *Red Wortleberry* or *Vaccinium Vitis Idæa* may be added, distinguished by being dotted and not reticulated on the under surface, and the margins crenated: also common *box* leaves, which can be recognized by their want of astringency.

[**Gaultheria.** The leaves of Gaultheria Precumbens. Partridgeberry, Wintergreen. U. S. Lin. Syst., Decandria monogynia: common in most parts of the United States.

Comp. & Prop. Taste, peculiar aromatic and somewhat astringent, odour aromatic; contains a heavy essential oil on which its properties depend.

Off. Prep. Oleum Gaultheria, obtained by distillation; it is a hydro carbon C_{20} H_{16} containing methy salicic acid C_{16} H_8 O_6.

Therapeutics. Gaultheria is stimulant, aromatic, and somewhat astringent; it is chiefly used in domestic practice. The oil is employed mainly as a flavoring ingredient.]

STYRACEÆ.

Styrax Preparatus. Prepared Storax. Liquid balsam from Liquidambar orientale; obtained from the bark in Asia Minor; purified by means of rectified spirit and straining.

Description. Storax occurs in two forms: the *liquid balsam* (officinal), of the consistence of bird-lime, almost opaque, with an aromatic odour, and a brownish yellow colour; and the *solid storax*, styrax calamita, in the form of masses which are friable, of a brownish-red colour, covered on the surface with a white efflorescence of benzoic or cinnamic acid, and becoming soft and clammy with the heat of the hand. The last variety is often mixed with saw-dust, turpentine and other impurities.

Prop. & Comp. Storax consists of a principle named *Styracin*, *Cinnamic acid*, a peculiar *resin*, and *Styrol*.

Styracin. (C_{36} H_{16} O_4) is a crystalline solid, resolved by the action of alkalies into cinnamic acid and *Styrone*, which last is a cinnamic alcohol (HO, C_{18} H_9 O). Styracin appears to be a cinnamate of cinnamic alcohol.

Cinnamic acid. (HO, C_{18} H_7 O_3) occurs in crystalline plates, and has powerful acid properties.

Styrol. (C_{16} H_8), a colourless oil, of an aromatic odour, converted into benzoic acid by the oxidizing action of chromic acid.

Storax, when pure, is soluble in alcohol and ether. Heated in a test tube on the vapour bath, it becomes more liquid but should give off no moisture. Boiled with solution of bichromate of potash and sulphuric acid it evolves the odour of hydride of benzule, from the Styrol contained in it.

Off. Prep. Storax is contained in Tinct. Benzoini Comp.

Therapeutics. The same as the balsams of Peru and Tolu.

Dose. Of the prepared resin, 5 gr. to 20 gr.

Benzoinum. Benzoin. A balsam (indurated in the air) flowing from the incised bark of Styrax Benzoin or Benjamin tree; Lin. Syst., Decandria monogynia; growing in Sumatra, Siam, Borneo, and other islands of the Eastern Archipelago.

Acidum Benzoicum. Benzoic Acid. A crystallized acid prepared from gum benzoin by sublimation.

Description. Benzoin occurs either in the form of reddish-white tears, separate or slightly adherent, or more frequently in masses consisting of the tears completely agglutinated with a brownish-red substance; on fracture, it presents an amygdaloid appearance; this forms *Siam* benzoin. Benzoin has little taste, but an agreeable odour. An inferior darker kind, called *Calcutta* benzoin, is sometimes met with.

Prop. & Comp. Benzoin contains from 10 to 20 per cent. of *Benzoic acid;* the remainder consists of a resin, partly soluble in ether. Benzoin is soluble in alcohol and liquor potassæ; and gives off, when heated, fumes of benzoic acid. *Benzoic acid* (HO C_{14} H_5 O_3), when pure, forms soft, feathery, flexible, white crystals, with a pearly lustre; generally impregnated with empyreumatic oil, which gives it a strong odour; slightly soluble in water, but readily so in rectified spirit; it is dissolved also by solutions of ammonia, potash, soda, and lime, from which it is precipitated by hydrochloric acid, unless the solution be very dilute. When heated it should sublime without residue.

Off. Prep. Tinctura Benzoini Composita. Compound Tinc-

ture of Benzoin. (Benzoin coarsely powdered, two ounces; prepared storax, two ounces; balsam of tolu, half an ounce; Socotrine aloes, one hundred and sixty grains; rectified spirit, one pint. Prepared by maceration.)

Benzoic Acid is prepared by subliming benzoin in an iron vessel, and collecting the sublimed acid by means of a cylinder of stiff paper inserted over the vessel.

Benzoic acid is contained in Tinctura Camphoræ cum Opio.

Therapeutics. *Benzoin* is a stimulant expectorant, formerly used in chronic bronchitic affections; externally in the form of the tincture (Friar's Balsam) it is applied as a stimulant to ulcers and wounds. *Benzoic acid*, when taken internally, is converted into and appears in the urine as hippuric acid, rendering the fluid more acid and somewhat irritating, but not diminishing the amount of uric acid: it is sometimes useful in catarrhus vesicæ attended with alkaline urine, &c.

Dose. Of benzoin, 10 gr. to 30 gr.: of the compound tincture, ½ fl. drm. to 1½ fl. drm., suspended in water by means of mucilage or yolk of egg; of benzoic acid, 10 gr. to 15 gr. Benzoate of Ammonia is described under Salts of Ammonia.

OLEACEÆ.

Olivæ Oleum. Olive Oil. An oil expressed from the fruit of Olea Europæa, the European Olive; Lin. Syst., Diandria monogynia; growing near the shores of the Mediterranean.

Sapo Durus. Hard Soap. [Sapo. U. S.] Soap made of olive oil and soda.

Sapo Mollis. Soft Soap. [Not officinal in U. S. P.] Made of olive oil and potash.

Glycerinum. Glycerine. [Glycerina. U. S.] A sweet principle, obtained from fats and fixed oils.

Descrip., Prop. & Comp. The olive fruit, used at dessert, is a smooth, elliptical, single-seeded drupe, about ¾ of inch long, and ½ inch in diameter, of a dark green colour. The oil, *Oleum Olivæ*, called also Salad oil, is of a pale straw colour, with a slight and agreeable odour and taste; sp. gr. 0·92; congeals partially at about 36°; and consists of about 72 per cent. of *Oleine*, and

28 per. cent. of *Margarine;* it unites with alkalies and other bases, forming soaps; the two alkaline soaps are named Sapo durus and Sapo mollis.

Sapo durus, or the combination of the oil with soda, called also hard soap, is greyish-white, horny and pulverizable when kept in warm dry air, easily moulded when heated. It is often marbled blue or red, when of the Castile variety, from the presence of a little oxide of iron. Hard soap is soluble in water; the solution is precipitated by lime, lead, and some other metallic salts: it is composed of *oleate* and *margarate* of soda.

Sapo mollis, the combination of the oil with potash, forms a yellow, transparent, very soft substance, inodorous, of the consistence of thick honey; it is usually spotted with white points, from some crystallization having taken place; in other respects it agrees with soda soap; it is a compound of *oleate* and *margarate* of potash. Both hard and soft soap should be entirely soluble in rectified spirit, and should not impart an oily stain to paper.

Glycerine, a substance which is separated, when all ordinary fats and oils are saponified or distilled with superheated steam, from the oleine, margarine, or stearine, contained in them, is a slightly yellow or colourless syrupy-looking liquid, sp. gr. 1·260, very sweet, oily to the touch, mixing readily with water and alcohol; the watery solution does not ferment with yeast, nor does glycerine itself evaporate or dry at an ordinary temperature. Its composition is represented by the formula ($C_6 H_8 O_6$); when decomposed by heat it evolves intensely irritating vapours. Glycerine possesses very remarkable solvent powers: arsenious acid, borax, many vegetable alkaloids and acids dissolve freely in it. Heated with starch (from 80 to 100 gr. to 1 fl. oz.) it forms a "plasma," which can be employed as an ointment.

Off. Prep.—Of Olive Oil. Linimentum Calcis. Liniment of Lime. (Solution of lime, two fluid ounces; olive oil, two fluid ounces.) [Solution of lime, eight fluid ounces; flax-seed oil, seven troy ounces. U. S.]

Linimentum Camphoræ. Liniment of Camphor. (Camphor, one ounce; olive oil, four fluid ounces.)

Olive oil is also used in the preparation of the Linimentum camphoræ compositum, Linimentum crotonis, of several plasters, and many of the ointments.

Of Sapo durus.

Emplastrum Saponis. Soap Plaster. (Hard soap, six ounces; litharge plaster, two pounds and a quarter; resin, one ounce.) [Soap, sliced, four troy ounces; plaster of lead, thirty-six troy ounces; water, a sufficient quantity. U. S.]

Linimentum Saponis. Liniment of Soap. (Hard soap, two ounces and a half; camphor, one ounce and a quarter; English oil of rosemary, three fluid drachms; rectified spirit, eighteen fluid ounces; distilled water, two fluid ounces.) [Soap, in shavings, four troy ounces; camphor, two troy ounces; oil of rosemary, half a fluid ounce; water, four fluid ounces; alcohol, two pints. U. S.] This liniment is commonly known by the name of Opodeldoc. Hard soap is also contained in many pill masses.

Therapeutics. Olive Oil is used in medicine internally as a demulcent in the form of emulsion; it may also be used as an enema: if taken in large doses it is slightly laxative, as is the case with almost all fixed oils: externally it is much employed in the form of liniment as a lubricating substance.

Soaps act as antacids, but are apt to disagree with the stomach from the liberation of the fatty acids contained in them, especially, as often happens, when not made of olive oil: they possess no particular value as internal remedies, and are more used as adjuncts to other drugs to aid in the formation of pills, than for their medicinal virtues. Soaps are used as external applications, and are more valued for their mechanical effects than for any special property they possess.

Glycerine is used on account of its physical properties as an adjunct to lotions in skin diseases, to prevent the surface becoming dry, or in the form of plasma; it has also been proposed as a substitute for oil in the treatment of some forms of deafness. It has likewise been used internally as a substitute for cod liver oil, but without much benefit.

Dose. Of olive oil, 1 fl. drm. to 1 fl. oz. or more, as a demulcent or laxative; of sapo durus or sapo mollis, as an antacid, &c., 5 gr. to 1 scruple; of glycerine, ½ fl. drm. to 2 fl. drm.

Adulteration. Soap made from animal oils or fats and potash, is very commonly employed in place of the officinal soft soap, and common hard soap is substituted for the Castile variety.

Manna. Manna. The juice (concreted) flowing from the incised bark of Fraxinus rotundifolia and Fraxinus ornus, Lin. Syst., Diandria monogynia; native of Sicily and Calabria. It is probable that both trees yield manna, and a similar substance can be obtained from Fraxinus excelsior, when growing in the southern part of Europe.

Description. Manna of the best description, called flake manna, forms long white pieces not unlike stalactite masses, from one to six inches in length, and about one to two inches broad, hollowed out and discoloured on the side which was attached to the tree; it is porous and friable; it may also occur in small masses, or tears, and when of an inferior kind, in broken and coloured fragments mixed with impurities. Manna has a sweetish odour and taste, but it is also rather bitter.

Prop. & Comp. Manna is readily soluble in water; it dissolves also in alcohol, and consists almost entirely of a peculiar sugar, named *Mannite* ($C_6 H_7 O_6$), which crystallizes in four-sided prisms, is sweet, and differs from grape or cane sugar in not fermenting; a small amount of *bitter matter* also exists in manna, the nature of which is unknown.

Therapeutics. A very mild laxative, adapted for children; also a pleasant adjunct to some purgative draughts; it sometimes causes flatulence and griping.

Dose. 60 gr. to ½ oz. or more.

The leaves of **Fraxinus Excelsior,** or Common Ash (not officinal), have long been used in medicine, and within the last few years they have been much extolled in Germany and France in the treatment of gout and rheumatism; their real composition is unknown. From the author's experience of their effects in acute gout, he is not at all inclined to think highly of their value, for in several cases they failed to afford the slightest alleviation, when the use of other treatment was immediately followed by relief; in the treatment of chronic gout, when taken for a long time and in large quantities in the form of decoction of the leaves (half an ounce to the pint), they probably may have some influence in keeping off attacks.

LOGANIACEÆ.

Nux Vomica. The seeds of Strychnos Nux Vomica. Nux vomica, or Koochla Tree; Lin. Syst., Pentandria monogynia; growing in the East Indies.

Strychnia. Strychnia, an alkaloid obtained from Nux Vomica.

Description of Nux vomica. The fruit is a round berry, like an orange, filled, when ripe, with a jelly-like pulp, and containing the *seeds*, which are round, flattened, and concavo-convex, from half an inch to an inch in diameter, very tough and horny, covered with a velvety down consisting of fine hairs; their colour is yellowish-grey, with no odour, but of an intensely bitter taste.

Prop. & Comp. Nux vomica contains two alkaloids, *strychnia* and *brucia*, united with a peculiar acid. Strychnia (C_{42} H_{22} N_2 O_4), crystallizes in four-sided prisms or octahedra; it requires about 1,000 parts of water to dissolve it, but communicates to it an intensely bitter taste; soluble in boiling rectified spirit, in ether and chloroform; it forms crystallizable salts with acids. Strychnia yields a colourless solution with pure sulphuric acid, which on the addition of bichromate of potash, acquires an intensely violet colour. It is not reddened by nitric acid. Brucia (C_{46} H_{26} N_2 O_8) crystallizes with eight equivalents of water; much more soluble in water, but less bitter than strychnia; soluble in alcohol; forms salts with acids; it is coloured red by nitric acid, but does not give the test with the bichromate of potash. *Igasuric* or *Strychnic* acid is united with the alkaloids; its solution precipitates copper salts bright green; it can be crystallized. A third alkaloid, *Igasuria*, has been stated to exist in nux vomica, which is more soluble in water than strychnia or brucia: recently Schutzenberger has asserted that many bases, allied to brucia in being reddened by nitric acid, are contained in the seeds of nux vomica; he detected them in the so-called Igasuria.

Off. Prep.—Of the Seeds of Nux Vomica. Extractum Nucis Vomicæ. Extract of Nux Vomica. (Prepared by first softening the seeds by steam, reducing them to powder and subsequently macerating in rectified spirit and evaporating to a proper consistence.)

Tinctura Nucis Vomicæ. Tincture of Nux Vomica. (Nux vomica, two ounces; rectified spirit, twenty fluid ounces. Prepared by maceration and percolation.) [U. S. Two pints of tincture are prepared by digestion and percolation from eight troy ounces of nux vomica.]

Of the Alkaloid Strychnia.

Liquor Strychniæ. Solution of Strychnia. [Not officinal in U. S. P.] (Strychnia, four grains; dilute hydrochloric acid, six min.; rectified spirit, two fluid drachms; distilled water, six fluid drachms.) A solution of strychnia in rectified spirit and water, slightly acidulated with hydrochloric acid; one grain of strychnia is contained in two fluid drachms.

Strychnia is prepared by the following process. Nux vomica is reduced to powder; this is accomplished by submitting it to steam, and then drying in a vapour bath or hot air chamber, and grinding it in a coffee mill. The powder is digested with a gentle heat in spirit and water, the spirit distilled off, and a solution of acetate of lead added, by which the colouring matters, &c., are precipitated. The precipitate is separated by filtration, and to the filtered liquid ammonia is added in slight excess; it is allowed to stand for twelve hours, and then the precipitate is collected on a filter, washed and dried. The dried product is boiled in rectified spirit till the fluid ceases to taste bitter, the greater part of the spirit distilled off, and the liquid evaporated to a small bulk and set aside to cool. The yellowish mother liquor is poured off from the white crust of strychnia, the white crust thrown on a filter and washed with two parts of rectified spirit and one of water, till the washings no longer become red with nitric acid. The strychnia is finally dissolved by boiling in rectified spirit, and the solution set aside to crystallize.

Therapeutics. Nux vomica is a powerful stimulant to the spinal cord, causing, in large doses, twitching of the muscles, followed by tetanic rigidity and death from asphyxia; paralysed parts are more readily affected than sound ones. It acts also as a bitter stomachic, and in some forms of dyspepsia, as in pyrosis, often relieves; its chief use, however, is in the treatment of paralysis, more especially when depending on lead poisoning,

or in other forms of local paralysis; sometimes, however, it is employed in paraplegia, and even in hemiplegia, when all inflammatory symptoms have subsided. The alkaloid *strychnia* acts exactly in the same manner as the nux vomica, of which it is the active ingredient; it should be given with great caution. *Brucia* is almost inert; from the author's experience it does not, *when pure*, produce any of the effects of strychnia, even in large doses; perhaps it is tonic and antiperiodic.

Dose. Of powdered nux vomica, 1 gr. to 3 gr.; of the extract, ¼ gr. to 2 gr.*; of the tincture, 10 min. to 30 min.; [5 min to 10 min. U. S.] of strychnia, $\frac{1}{32}$ to $\frac{1}{8}$ gr. or ¼ gr. cautiously increased; of the solution, 5 min. to 15 min. or more.

Adulteration of *strychnia.* The presence of *brucia*, in varying, sometimes large, quantities, rendering the alkaloid much less powerful; detected by the red colour produced by nitric acid. The bark of strychnos nux vomica contains the same alkaloids as the seeds; it is known as False Angustura Bark, being sometimes employed to adulterate the true Angustura Bark; for the method of distinguishing this adulteration, *vide* Cusparia.

Faba Sancti Ignatii. [Ignatia. U. S.] St. Ignatius' Bean. The seed of the Strychnos Ignatii; Lin. Syst., Pentandria monogynia; inhabiting the Philippine Islands. (Not officinal.)

[Extractum Ignatiæ Alcoholicum. Alcoholic Extract of Ignatia. U. S. A tincture is obtained by percolation and evaporated to form an extract.]

Description. The seeds are of a brown colour, semitransparent, of a tough horny texture; convex on one side; somewhat triangular, with irregular facets on the other.

Prop. & Comp. These beans are remarkable for the large proportion of *Strychnia* they contain, the quantity being greater than that yielded by the nux vomica seeds. They yield about 1·2 per cent. of the alkaloid, and their activity is due to the presence of this substance. An extract has been made from them, which is thought by some to differ in its properties from that of nux vomica, but there can be no doubt the difference is in degree only, strychnia being the active ingredient.

* Two grains of good extract of nux vomica is a *very* large dose. More than half a grain can not commonly be given without risk of producing unpleasant symptoms.—Ed.

[Dose of the extract ¼ of a gr. carefully increased.]

ASCLEPIADACEÆ.

Hemidesmus. Hemidesmus. The Root of Hemidesmus Indicus; [Not officinal in U. S. P.] Lin. Syst., Pentandria digynia. Indian Sarsaparilla. Native of India.

Description. Hemidesmus occurs in long cylindrical pieces; the colour of the cortex is dark, marked by longitudinal divisions and deep circular rings; the central portion ligneous; it has a somewhat fragrant odour, and an agreeable bitter taste.

Prop. & Comp. It yields its active properties to boiling water, and contains a peculiar volatile, crystallizable substance, with acid properties: this has been called hemidesmic acid, but little is known concerning it.

Off. Prep. Syrupus Hemidesmi. Syrup of Hemidesmus. (Hemidesmus, four ounces; refined sugar, twenty-eight ounces; boiling distilled water, twenty fluid ounces.)

Therapeutics. Its action is supposed to be the same as sarsaparilla, and it has been used as a substitute for that root, especially in India, in syphilitic cutaneous eruptions, &c., and also in some diseases of the kidney.

Dose. Of the Syrup, 1 fl. drm. to 2 fl. drm. The Syrup of Hemidesmus must be looked upon more as a flavouring than a medicinal agent, as the amount of the drug contained in an ordinary dose of this preparation is very small.

A decoction may be made from it, in lieu of sarsaparilla, when the real action of hemidesmus is required. Dose from 1 fl. oz. to 4 fl. oz.

Cynanchum Argel, the leaves of which have been referred to as constituting one of the adulterations of senna, belongs to this natural order.

SPIGELIACEÆ.

Spigelia. Carolina Pink. [Pink Root.] The root of Spigelia Marilandica; Lin. Syst., Pentandria monogynia; native of the south and south-western parts of North America. (Not officinal.) [Officinal in U. S. P.]

Description. The root consists of a thick globular head, from which numerous thinner and tortuous fibres branch out; it has a brown colour.

Prop. & Comp. The root contains, in addition to saccharine and mucilaginous matters, a *volatile* and fixed oil, and a peculiar *bitter principle*, soluble in water. The oily and bitter matters probably give activity to the drug.

[*Off. Prep.* Extractum Spigeliæ Fluidum. Fluid Extract of Spigelia. U. S. A tincture is obtained by percolation from sixteen troy ounces of Spigelia, and concentrated by evaporation, so that with the addition of eight troy ounces of sugar, it measures a pint.]

[Extractum Spigeliæ et Sennæ Fluidum. Fluid Extract of Spigelia and Senna. U. S. Fluid extract of spigelia, ten fluid ounces; fluid extract of senna, six fluid ounces; carbonate of potassæ, half a troy ounce; oil of anise, oil of caraway, each twenty minims.]

[Infusum Spigeliæ. Infusion of Spigelia. U. S. Spigelia, half a troy ounce; boiling water, a pint. Prepared by maceration.]

Therapeutics. Much employed in the United States as an anthelmintic; it produces, in moderate doses, considerable cathartic action, and in some cases, peculiar narcotic effects.* It may be administered in substance, or in the form of infusion; generally combined with a purgative.

Dose. 60 gr. to 120 gr. for an adult. [For a child 3 or 4 years old, of the fluid extract 1 or 2 drachms; of the fluid extract of spigelia and senna, 1 to 2 fluid drachms; of the infusion, half a fluid ounce to a fluid ounce.]

GENTIANACEÆ.

Gentiana. Gentian. The dried root of Gentiana lutea, or Yellow Gentian; Lin. Syst., Pentandria digynia; growing chiefly in the European Alps and Pyrenees; imported from Marseilles and other French ports.

Description. The root occurs in lengthened cylindrical pieces, from ½ inch to 1 inch in diameter, and several inches long; wrink-

* Spigelia has no purgative action, and it *very* rarely produces any decided effect on the nervous system.—Ed.

led longitudinally, and often twisted; brown externally; yellow and spongy, yet tough, within. Of a sweet odour, and bitter and sweet taste.

Prop. & Comp. Gentian yields to water and spirit its bitter principle, *gentianite*, which has not been crystallized; *gentianin* (C_{14} H_5 O_5), which can be crystallized in yellow needles, but is not bitter, its colour is deepened by alkalies; formerly it was supposed to be the active principle. Sugar, gum, and pectin, &c., are also present in gentian root.

Off. Prep. Extractum Gentianæ. Extract of Gentian. (Prepared by maceration and subsequent decoction, and reduction by evaporation to a proper consistence.) [Prepared by percolation, and the percolate afterwards boiled to three-fourths its bulk, and then reduced to a proper consistence by evaporation. U. S.]

Infusum Gentianæ Compositum. Compound Infusion of Gentian. (Gentian, a quarter of an ounce; bitter orange peel, thirty grains; coriander, thirty grains; proof spirit, two fluid ounces; cold distilled water, eight fluid ounces. Prepared by maceration, first in proof spirit and afterwards in the proof spirit and cold water.) [Prepared by percolation. U. S.]

Tinctura Gentianæ Composita. Compound Tincture of Gentian. (Gentian, one and a half ounce; bitter orange peel, three quarters of an ounce; cardamoms, one quarter of an ounce; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.) [Gentian, two troy ounces; bitter orange peel, a troy ounce; cardamom, half a troy ounce, all in moderately fine powder; diluted alcohol, a sufficient quantity. Two pints of tincture are prepared by percolation. U. S.]

[Extractum Gentianæ Fluidum. Fluid Extract of Gentian. Sixteen ounces of fluid extract are prepared by percolation with diluted alcohol, and subsequent evaporation, from sixteen troy ounces of Gentian.]

Therapeutics. Gentian is a simple bitter, or stomachic tonic, improving the appetite and giving tone to the stomach; hence useful in convalescence from acute disease, and in cases of dyspepsia attended with an atonic condition of that viscus.

Dose. In substance, from 10 gr. to 30 gr.; of extract, 5 gr.

and upwards; of infusion, 1 fl. oz. to 2 fl. oz.; of compound tincture, 1 fl. drm. to 2 fl. drm.; [of fluid extract, 1 fl. drm.]

Chirata. Chiretta. Lin. Syst., Pentandria monogynia; the entire plant, Ophelia Chirata, grows in the northern parts of India.

Description. As imported, it is in bundles consisting of the stems of the plant, about three feet long, about the size of a goose quill; smooth, pale brown, with numerous small flowers, and part of the roots attached; the stems have a yellow pith.

Prop. & Comp. The plant is very bitter, and yields to water and alcohol a bitter extractive, similar to that obtained from gentian.

Off. Prep. INFUSUM CHIRATÆ. Infusion of Chiretta. (Chiretta, a quarter of an ounce; distilled water, at 120°, ten fluid ounces.)

TINCTURA CHIRATÆ. Tincture of Chiretta. (Chiretta, two and a half ounces; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.)

Therapeutics. Exactly the same as gentian.

Dose. Of the infusion, 1 fl. oz. to 2 fl. oz.; of the tincture, 1 fl. drm. and upwards.

Other plants belonging to this order, as ERYTHRÆA CENTAURIUM, the Common Centaury, and MENYANTHES TRIFOLIATA, the Common Buck-bean, contain a similar bitter principle, and have been occasionally employed in the place of gentian root.

CONVOLVULACEÆ.

Scammoniæ Radix. Scammony Root. The dried root of Convolvulus Scammonia. Lin. Syst., Pentandria monogynia; growing in Syria, and exported chiefly from Smyrna.

Scammonium. Scammony, a gum resin, exuding from the cut root of the living plant, Convolvulus Scammonia.

Scammoniæ Resina. Resin of Scammony. A resin obtained by means of rectified spirit, from dried Scammony Root, or from Scammony itself.

Description. The *root* is tap shaped, sometimes 3 inches in diameter at the top, brown without, white within, odorous, but with little taste.

Scammony occurs in masses, irregular in shape and size, of a blackish-green colour, covered with fine powder, porous, brittle, with a shining fracture. It has a musty odour, makes a lather when rubbed on the surface with water; the taste is nauseous and acrid after a few minutes. The *resin* obtained by means of rectified spirit from scammony root or scammony is in brownish, translucent pieces, brittle, resinous in fracture, and if prepared from the root, of a sweet fragrant odour.

Prop. & Comp. Scammony consists chiefly of a resin, sometimes in the form of a glucoside, sometimes in part as a resinous acid; the latter is soluble in ammonia; scammony resin is soluble in alcohol and ether, but precipitated from its solution on the addition of water. It has been stated to have the composition (C_{40} H_{33} O_{20}).

Scammony should emit no bubbles of gas when treated with hydrochloric acid, nor, when digested in water of 170° Fah., should the fluid be tinged of a blue colour on the addition of iodide of potassium and dilute nitric acid, or free iodine. Of pure or virgin scammony, 80 or 90 per cent. should be soluble in ether. The above tests show the absence of chalk or starch, and also the amount of resin. The resin cannot form singly an emulsion with water, as it contains no gum. Its tincture should not render the fresh cut surface of a potatoe blue; this shows the absence of guaiacum, with which it is often adulterated.

Off. Prep.—Of the root. Resina. The resin is prepared by exhausting the root by maceration and percolation with rectified spirit. The tincture thus made is diluted with water, and the spirit distilled off. The residue is allowed to become cold, the supernatant fluid poured off, the resin washed two or three times with hot water, and dried on a porcelain plate.

Of Scammony or Resin of Scammony.

Confectio Scammonii. Confection of Scammony. [Not officinal in U. S. P.] (Scammony or resin of scammony, in fine powder, three ounces; ginger, in fine powder, an ounce and a half; oil of caraway, one fluid drachm; oil of cloves, half a fluid drachm; syrup, three ounces; clarified honey, one ounce and a half.)

Mistura Scammonii. Scammony Mixture. [Not officinal in

U. S. P.] (Made by triturating four grains of resin of scammony with two fluid ounces of unskimmed milk, so as to form an emulsion.)

Pulvis Scammonii Compositus. Compound Scammony Powder. [Not officinal in U. S. P.] (Scammony, four ounces; jalap, three ounces; ginger, one ounce. Rub them separately into a very fine powder, and mix.)

Scammony, or its resin, also forms an important ingredient in Extractum colocynthidis compositum, and Pilula colocynthidis composita and Pilula colocynthidis composita et hyoscyami.

Therapeutics. A drastic purgative, generally causing much watery discharge, and often griping; useful to give activity to other purgatives, which appear to diminish its violence. It is employed in cerebral and dropsical effusions, torpidity of bowels, and as a vermifuge for children; it is contra-indicated in inflammatory affections of the digestive organs.

Dose. Of the powdered scammony (pure) 4 gr. to 10 gr.; of scammonin (the pure resin) 4 gr. to 10 gr.; of conf. scammonii, 15 gr. to 30 gr. or more; of mist. scammonii, 2 fl. oz.; of pulv. scammonii comp., 6 gr. to 15 gr. As an adjunct to other purgatives, it may be given in smaller quantities.

Adulteration. Scammony is most extensively adulterated with *chalk*, *flour*, other *resins*, and *extracts*. Sometimes the drug contains but a small per-centage only of real scammony. The frauds are detected by the tests given above.

Jalapa. Jalap. The tuber [root. U. S.] of Exogonium Purga, or true Jalap plant; Lin. Syst., Pentandria monogynia; growing in Mexico; it was named from the city Xalapa.

Jalapæ Resina. Resin of Jalap. A resin obtained from Jalap by means of rectified spirits.

Description. Jalap tubers are ovoid, more or less pointed, varying from ½ inch to 3 or four inches in diameter, of a brown colour, and wrinkled externally; internally, yellowish, and in concentric layers. Structure dense and resinous in appearance; occasionally it is found worm-eaten. Sometimes the tubers are sliced.

The *Resin of Jalap* is in dark brown opaque fragments, trans-

lucent at the edges, breaking with a resinous fracture, and readily reduced to a pale brown powder.

Prop. & Comp. *Jalap* has a sweetish odour and taste, at the same time nauseous; it contains from 10 to 15 per cent. of resin, and about 20 per cent. of watery extractive matter, with starch, &c. *Jalap resin* is insoluble in oil of turpentine; soluble in alcohol, ether, or water; it becomes crimson with oil of vitriol. Jalap resin consists of at least two resinous bodies: one named Jalapine (Rhodeoretin), a glucoside (C_{62} H_{50} O_{32}), nearly insoluble in ether. The second, sometimes termed Jalapic acid, or Pararhodeoretin (C_{40} H_{34} O_{18}), is soluble in ether, and has the strong odour of the drug. The so-termed Jalapine of the shops is the resin of jalap extracted by spirit from the tuber, and afterwards precipitated by means of water.

Off. Prep. Extractum Jalapæ. Extract of Jalap. (This is a mixed spirit and cold water extract, made by treating the powdered jalap first with rectified spirit, and afterwards with cold water, evaporating the tincture and watery solution separately to a soft state, and afterwards mixing them together and evaporating the whole to the consistence of an extract at a temperature not exceeding 140°.)

Pulvis Jalapæ Compositus. Compound Powder of Jalap. (Jalap, in powder, five ounces; acid tartrate of potash, nine ounces; ginger, in powder, one ounce.) [Jalap, a troy ounce; bitartrate of potassa, two troy ounces; both in fine powder. U. S.]

Tinctura Jalapæ. Tincture of Jalap. (Jalap, coarsely powdered, two ounces and a half; proof spirit, one pint. Prepared by maceration and percolation.) [Two pints of tincture are obtained by percolating six troy ounces of jalap with a mixture of two measures of alcohol and one of water. U. S.] Proof spirit takes up both the resin and watery extract.

Jalap is also an active ingredient in Pulvis scammonii compositus.

Therapeutics. Jalap is a brisk purgative, causing watery discharge; much allied to, but less irritant than, scammony; used as an ordinary purgative in costiveness and inflammatory affections, especially when combined with aromatics, which diminish

the griping; also as a hydragogue in dropsies, and vermifuge when joined with the acid tartrate of potash or calomel.

Doses. Of the powder, 10 gr. to 30 gr.; of the resin, 2 gr. to 6 gr.; of ext. jalapæ, 6 gr. to 20 gr.; of tinct. jalapæ, ½ fl. drm. to 2 fl. drm.

Adulteration. Other roots, as of Ipomea orizabensis, &c., distinguished by the absence of the characters of true jalap.

SOLANACEÆ.

Dulcamara. Dulcamara. The young branches, dried, of Solanum Dulcamara, Woody Nightshade or Bitter-Sweet; Lin. Syst., Pentandria monogynia; indigenous, growing in hedges.

Description. The dried twigs are met with in small cylindrical pieces, 1 or two inches long, about the size of a goose quill; of a brown colour externally, pale within, light from containing much pith: the twigs should be collected in autumn, when devoid of leaves.

Prop. & Comp. Without odour; of a sweetish-bitter taste; contains an alkaloid *Solania* (C_{86} H_{70} NO_{32} ?) crystallizing in white pearly scales or needles; insoluble in water and ether; soluble in alcohol; found also in Solanum nigrum and Solanum tuberosum. A bitter-sweetish extract, named *Dulcamarine* or *Picroglycion*, exists also in the twigs; the acid is probably the malic.

Off. Prep. Infusum Dulcamaræ. Infusion of Dulcamara. (Dulcamara, one ounce; boiling distilled water, ten fluid ounces.)

Therapeutics. The real action of dulcamara is unknown; it does not dilate the pupils or produce dryness of the throat like belladonna, henbane, or stramonium, but it seems to act on the skin and kidneys; it has been employed chiefly in chronic skin diseases, as lepra and psoriasis; occasionally it has been used in cachectic states of the system, as an alterative, as in syphilis.

Dose. Of the infusion, 1 fl. oz. to 4 fl. oz., or more.

Belladonna. Belladonnæ. [Belladonna folium. The leaves of Atropa Belladonna. U. S.] The recent and dried leaf of Atropa Belladonna, or Deadly Nightshade; Lin. Syst., Petandria monogynia; indigenous, growing in woods and gardens.

Belladonnæ Radix. Belladonna Root. The dried root of Atropa Belladonna.

Atropia. A crystalline alkaloid, prepared from the root of Belladonna.

Description. The *leaves* are large, ovate, entire, smooth, and soft, fœtid when bruised; placed in pairs, unequal in size; the flowers are of a dirty violet brown; the *root* is from 1 to 2 feet long, from ½ an inch to 2 inches thick, tapering, and branched; its colour is brownish white. The uncultivated plant is stated to be preferable to the cultivated.

Prop. & Comp. All parts of the plant contain the officinal alkaloid, *Atropine* ($C_{34}H_{23}NO_6$), which occurs in white crystalline acicular prisms; soluble to some extent in water, much more so in ether and alcohol; its solution in water has an alkaline reaction, yields a citron-yellow precipitate with terchloride of gold, and has a bitter taste. If pure, it dissolves completely in ether, and is entirely dissipated by heat. Atropine probably exists in the plant in combination with malic acid. Other principles have been described, as *Belladonnine*, &c., but little is known about them.

Off. Prep.—Of the Leaves. (Belladonna.) Extractum Belladonnæ. Extract of Belladonna. (A green extract prepared from the juice of the leaves and young branches of belladonna.)

[Extractum Belladonnæ Alcoholicum. U. S. Six pints of tincture are obtained from twenty-four troy ounces of belladonna leaves, by percolation with diluted alcohol, and evaporated in a water-bath to the consistence of an extract.]

Emplastrum Belladonnæ. Belladonna Plaster. (Extract of belladonna, three ounces; soap plaster, one ounce and a half; resin plaster, one ounce and a half.) [Alcoholic Extract of Belladonna, a troy ounce; resin plaster, two troy ounces. U. S.]

Tinctura Belladonnæ. Tincture of Belladonna. (Belladonna leaves, in coarse powder, one ounce; proof spirit, one pint. Prepared by maceration and percolation.)

This tincture has about half the strength of Tincture Belladonnæ, *Lond.* 1851, *Dub.* 1850.

[Two pints of tincture are procured from four ounces of Belladonna leaf, by percolation with diluted alcohol. U. S.]

Unguentum Belladonnæ. Belladonna Ointment. (Extract of belladonna, eighty grains; prepared lard, one ounce.) [Extract of belladonna, sixty grains; water, half a fluid drachm; lard, a troy ounce. The extract is first rubbed with the water and then with the lard. U. S.]

Off. Prep.—Of the Root. Atropia. This alkaloid is prepared by exhausting the recently dried root with rectified spirit, precipitating the colouring and other matters by means of lime, and removing the excess of lime by sulphuric acid. Three-fourths of the spirit are then distilled off, water added, and the liquid evaporated till it no longer smells of alcohol. A solution of carbonate of potash is then added to render the fluid nearly neutral; it is set aside for six hours, and filtered. The filtrate is rendered strongly alkaline with carbonate of potash, and shaken up well with chloroform; the chloroform is allowed to subside, and is then drawn off and evaporated on a water bath; the residue is dissolved in warm rectified spirit digested with a little animal charcoal; filtered; and allowed to evaporate, and set aside to cool till crystals are obtained.

Linimentum Belladonnæ. Belladonna Liniment. [Not officinal in U. S. P.] (Made by exhausting, by maceration and percolation, belladonna root with rectified spirit, and afterwards adding a little camphor. Each fluid part of the liniment represents a solid part of the root.)

Of Atropine. Liquor Atropiæ. [Not officinal in U. S. P.] Solution of Atropia. (A solution of atropia in water, with the addition of one-eighth of rectified spirit.) One ounce contains four grains of the alkaloid.

Unguentum Atropiæ. Ointment of Atropia. [Not officinal in U. S. P.] (Eight grains of atropia dissolved in spirit and made into an ointment, with one ounce of lard.)

Therapeutics. Applied to the eye, belladonna, or any of its preparations, causes dilatation of the pupil, a topical effect only; when applied to a painful part, relief is often afforded. Taken internally in small doses, the first effect noticed by the patient is dryness of the throat, thirst, and a difficulty of deglutition; if continued, or given in larger doses, the vision becomes impaired, and the pupils dilated. The alteration of vision appears to be

due to the production of presbyopia from want of adjusting power of the eye, and not to diminished sensibility of the retina: the further effects produced by the drug are seen in the excitement of the excito-motory system, and of the mental faculties, and delirium, generally of a harmless character, accompanied with intense thirst, ensues; beyond this, belladonna produces redness of the skin, convulsions, coma, and death. The effects of *Atropia* are identical with those of the plant itself.

Belladonna is given internally to allay pain and spasm in neuralgic affections, gastrodynia, colic, and spasms of the different sphincters, as of the uterus, bladder, and rectum; also in some nervous diseases, as chorea, epilepsy, and certain forms of hysteria, pertussis, asthma, and other nervous coughs. Externally, the preparations of belladonna or atropia are employed to dilate the pupil in ophthalmic cases; sometimes belladonna is used in the form of fomentation or ointment to painful parts, sometimes as an injection.

Dose. Of the extract, $\frac{1}{8}$ gr. to 1 gr.; of the tincture, 5 min. to 30 min.

Atropine should not, as a rule, be given internally; the officinal solution, diluted or not, may be employed by the oculist. The extract or ointment of belladonna may be used for the same purpose, smeared round the eye.

Incompatibles. Caustic fixed alkalies, as soda and potash, when in contact with preparations of belladonna or atropine, destroy their activity by causing the decomposition of the atropine contained in them.

Stramonii Folia et Semina. [Folium et Semen. U. S.] The dried leaves and ripe seeds of Datura Stramonium, or Thorn Apple; Lin. Syst., Pentandria monogynia; an indigenous plant growing in waste places.

Description. The *leaves* are large, ovate, smooth, unequally sinuate, toothed, dark green, of a rank odour when fresh; they should be gathered when the plants are in flower. The *seeds* are brownish-black, reniform, and flattened.

Prop. & Comp. All parts of the plant contain an alkaloid named *Daturia* (C_{34} H_{23} N O_6), in white prisms; with properties

like those of atropia, it is united perhaps with malic acid; probably daturia and atropia are identical.

Off. Prep.—Of Seeds. Extractum Stramonii. Extract of Stramonium. (Prepared from the seeds by percolation with proof spirit, and subsequent evaporation to the consistence of extract.)

[Extractum Stramonii. U. S. Made from the leaves by expressing the juice and evaporating at a temperature not exceeding 160°.

Extractum Stramonii Alcoholicum. U. S. Prepared by evaporating a tincture obtained by percolation.]

Tinctura Stramonii. Tincture of Stramonium. (Stramonium seeds, two ounces and a half; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.)

Therapeutics. The action of stramonium appears to be exactly the same as that of belladonna; dryness of the throat, dilatation of the pupils, delirium, coma, and death ensue from poisonous doses of the drug. Stramonium has been supposed to influence especially the respiratory organs as an anti-spasmodic, and has been much used in asthma, chiefly in the form of smoke from the burning leaf employed in the same way as tobacco. The extract has also been used in convulsive coughs, as an anti-spasmodic and as an anodyne in gastrodynia and other painful affections.

Dose. Of leaves (powdered), 1 gr. upwards; of the extract, ¼ gr. to 1½ gr.; of the tincture, 10 min. to 30 min. When smoked, any dryness of the throat or dilatation of the pupils indicates the propriety of its discontinuance for a time.

Incompatibles. Caustic fixed alkalies, as soda and potash, when in contact with the preparations of stramonium, decompose their active principle, and render them inert. See Belladonna.

Hyoscyamus. Hyoscyamus. The fresh and dried leaf and young branches of Hyoscyamus niger, or Henbane; the second year's herb; Lin. Syst., Pentandria monogynia; indigenous, growing in waste places. [Hyosciami folium. Henbane leaf. The leaves of Hyosciamus niger. Hyosciami semen. Henbane seed. The seeds of Hyosciamus niger. U. S.]

Description. The leaves are green in colour when fresh, sessile, oblong, acutely sinuous, wooly or hairy, viscid and fœtid. The seeds are very small and brown, not officinal, but sometimes employed medicinally.

Prop. & Comp. All parts of the plant contain *Hyoscyamia*, an alkaloid only once or twice obtained in a crystalline state; an acid, probably *malic*, and a volatile principle are also present.

Off. Prep. Extractum Hyoscyami. Extract of Hyoscyamus. (A green extract prepared from the juice of the fresh leaves and young branches, as the other green extracts.)

[Extractum Hyosciami Alcoholicum. Alcoholic Extract of Henbane. U. S. Prepared by evaporating a tincture obtained by percolation from the leaves.]

Tinctura Hyoscyami. Tincture of Hyoscyamus. (Dried hyoscyamus leaves, two and a half ounces; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.)

Extract of Hyoscyamus is contained in Pilula Colocynthidis et Hyoscyami.

Therapeutics. Henbane appears to act as belladonna and stramonium, but is much milder, and is used chiefly as a sedative in certain excited conditions of the nervous system when opium is not advisable; it is also employed to diminish pain and allay irritation of the bladder, to prevent the griping of purgative medicines, ease cough, and diminish spasm in very many diseases. It, as well as stramonium, may be used to dilate the pupil in place of belladonna.

Dose. Of the extract, 5 gr. to 10 gr., or more [of the alcoholic extract, 1 gr. to 3 gr.]; of the tincture, 20 min. to 1 fl. drm. or upwards.

Incompatibles. Caustic fixed alkalies, as potash or soda, when in contact with the preparations of henbane, destroy their activity by causing the decomposition of the active principle contained in them.

Tabacum. Leaf Tobacco. The dried leaves of Nicotiana Tabacum. Virginian Tobacco; Lin. Syst., Pentandria monogynia: growing chiefly in tropical America.

Description. The leaves are large, ovate or oblong, lanceolate,

acuminate, with numerous short glandular hairs; odour slight when fresh, but becoming heavy or narcotic in drying; taste bitter and somewhat acrid; pale green when fresh, mottled-brown when dry. Officinal tobacco is not manufactured.

Prop. & Comp. Tobacco leaves when distilled with caustic potash yield a liquid alkaloid, *Nicotia* or *Nicotina* (C_{20} H_{14} N_2); when pure, it occurs as a colourless oil, but becomes yellow by exposure; sp. gr. 1·027; volatilizes at 480° Fah. It is soluble in water, alcohol, and ether; it neutralizes acids, but the salts are difficult to crystallize; its solutions give rise to a precipitate with bichloride of platinum and tincture of galls. Nicotine is very poisonous and is contained in tobacco smoke. Virginian tobacco contains about 6 or 7 per cent. of the alkaloid. The acid of the plant is probably malic acid. A volatile oil, named *Nicotianin*, is also present.

Off. Prep. Enema Tabaci. Enema of Tobacco. [Not officinal in U. S. P.] (Tobacco, twenty grains; boiling water, eight fluid ounces.)

Therapeutics. Tobacco, when internally administered, acts as a powerful sedative, especially affecting the heart; it frequently causes diuresis, and has been used in dropsy. It is however seldom employed as an internal remedy, on account of the dangerous depression often induced. Enema Tabaci was occasionally prescribed (although seldom since the introduction of chloroform) in strangulated hernia, ileus, &c.; to produce great muscular relaxation. Externally, tobacco acts as a powerful irritant, and is occasionally ordered medicinally in the form of snuff, as an errhine in head affections, &c.; also in the form of smoke, as a sedative and expectorant in some varieties of asthma.

Dose. The Enema Tabaci contains about the quantity of the drug safe to administer at a time.

Capsicum. Capsicum. The dried ripe fruit of Capsicum fastigiatum; Guinea Pepper, Pod Pepper, Chillies; Lin. Syst., Pentandria monogynia; imported from Guinea and the East and West Indies.

Description. A small oblong, cylindrical or conical membranous pod, of a bright scarlet or orange-red colour, shining on the

surface, divided internally into two or three cells, containing some spongy pulp and numerous white, flat, reniform seeds. This fruit is from five to eight lines long, and about two lines broad.

Prop. & Comp. No odour, taste hot and acrid. It contains a volatile principle, *capsicin*, somewhat like a concrete volatile oil, which is soluble in alcohol, ether, essential oils, and slightly so in water; intensely hot in taste, and crystallizable when pure; it possesses basic properties and forms crystallizable salts with some vegetable and mineral acids. The pod also contains a red extractive or colouring matter of which little is known.

Off. Prep. Tinctura Capsici. Tincture of Capsicum. (Capsicum, three quarters of an ounce; rectified spirits, twenty fluid ounces. Prepared by maceration and percolation.) [U. S. Two pints of tincture are obtained from a troy ounce of capsicum, in powder, by percolation with diluted alcohol.]

Therapeutics. Capsicum acts as a powerful topical stimulant, and also on the general system; used chiefly as a condiment, sometimes in atonic dyspepsia; diarrhœa, and extreme prostration; as a gargle in cynanche maligna, and scarlatina; externally it can be used as a rubefacient.

Dose. Of powder, 1 gr. to 5 gr. in pills; of tincture, 5 min. to 10 min. As a gargle, ½ fl. drm. to 2 fl. drm. to 5 oz. of fluid.

Adulteration. The powdered capsicum (cayenne pepper) is extensively adulterated with red-lead and other like coloured substances.

SCROPHULARIACEÆ.

Digitalis. ℥ Digitalis. Foxglove. The dried leaf of Digitalis purpurea, or Purple Foxglove; the wild plant; Lin. Syst., Didynamia angiospermia. Indigenous.

Digitalinum. Digitaline. The active principle obtained from Digitalis.

Description. The leaf is ovate, lanceolate, or oblong; crenate rugous, and downy, more especially on the under surface, which is veined; subsessile, or with a short petiole: of a dull green colour. The leaves should be gathered before the terminal flowers have expanded, the petiole and midrib removed, and the laminæ carefully dried.

Prop. & Comp. Digitalis leaves have but little odour; their taste is somewhat bitter and acrid, they contain a non-nitrogenized amorphous principle, *Digitaline*, which occurs in white, or slightly yellow scales or mamillated masses; very bitter, without odour, but irritating to the nostrils; little soluble in water and ether, but readily soluble in spirit. Soluble in acid solutions, but without neutralizing them; its solution in hydrochloric acid soon becomes green: when burnt on platina foil it leaves no residue. Several other substances have been said to occur, to which peculiar names have been given, but whose nature and properties are but ill-understood. The leaves, however, contain some *tannin*.

Off. Prep.—Of Digitalis. Infusum Digitalis. Infusion of Digitalis. (Dried digitalis leaves, thirty grains; boiling distilled water, ten fluid ounces.) [Digitalis, in coarse powder, sixty grains; tincture of cinnamon, a fluid ounce; boiling water, half a pint. U. S.]

Tinctura Digitalis. Tincture of Digitalis. (Digitalis leaves, dried, two and a half ounces; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.)

Digitaline is prepared by making a strong tincture of the leaves by digestion in rectified spirit at a temperature of 120°; and treating the extract obtained from the evaporation of the tincture with water acidulated with acetic acid; from this solution, after neutralization with ammonia, the digitaline is precipitated by tannic acid; the tannic acid is afterwards removed by rubbing the tannate of digitaline with oxide of lead (litharge), and spirit; by which an insoluble tannate of lead is formed, and the digitaline set free and dissolved by the spirit. This solution after decolorization with a small amount of animal charcoal is evaporated, and the residual digitaline washed repeatedly with ether to remove any impurities.

Therapeutics. When taken internally, the most marked effect produced by the drug is the weakening of the heart's power, accompanied by a diminished rate of the pulse; some observers assert, that the heart's action is primarily quickened. If the dose be increased, or continued after a certain amount of cardiac weakness has been induced, symptoms of an alarming character may arise, such as nausea, vomiting, faintness, and syncope: this is

especially apt to occur when the patient attempts to make any exertion, or even to sit or stand up; in fact, patients under the full influence of the drug, which is sometimes purposely induced, are only in safety when in an horizontal position. Although digitalis acts so powerfully upon the heart, yet its influence over the capillary circulation, when in a morbid condition, is by no means so powerfully exercised as in the case of antimonial and mercurial preparations. Digitalis often produces copious diuresis, more especially when the deficiency of the urinary secretion depends on cardiac disease; it also occasionally induces sleep, or acts as a sedative and soporific, but only when the restlessness is due to an over-excited state of the heart. Digitalis is administered as a cardiac sedative in almost all cases where there is exalted action, whether sympathetic in nature, or depending on organic disease of that organ, or of the great vessels, as in hypertrophy, aneurism, or valvular disease, &c.; it should, however, always be borne in mind, that increased action of the heart is not always an indication of increased strength. Digitalis may be given also in hæmorrhages of an active character, and as a diuretic in dropsies depending on the above-named cardiac diseases, and sometimes in other forms. Some practitioners have proposed the use of digitalis in inflammatory affections, but in these cases its efficacy has not been well established. It has also been employed in phthisis, but without permanent benefit; for although it often in these cases diminishes the rapidity of the pulse, it exerts no influence on the progress of the tubercular disease. Digitalis is generally asserted to be a drug the action of which is *cumulative* in character: the explanation of this peculiarity appears to the author to be as follows, viz.: that considerable weakening of the heart's action may occur without any very evident symptom being produced; but if this is increased above a certain point, so as to interfere with the efficiency of the circulation, then all the symptoms are rapidly and dangerously manifested.

Dose. Of the powdered leaves, ½ gr. to 2 gr.; of infusion, 2 fl. drms. to ½ fl. oz. or more; of tincture, 5 min. to 40 min. and upwards; of digitaline, $\frac{1}{40}$ gr. to $\frac{1}{10}$ gr.

Adulteration. Digitalis leaves are occasionally mixed with those of *Verbascum thapsus* and other plants. Attention to the charac-

ters of the true leaf, above given, will readily distinguish the admixture.

LABIATÆ.

Rosmarini Oleum. English Oil of Rosemary. The oil distilled in England from the flowering tops of Rosmarinus officinalis, or rosemary; Lin. Syst., Diandria monogynia; growing chiefly on the hills in the South of Europe.

Prop. & Comp. This oil has the fragrant odour and taste of the plant, colourless, sp. gr. 0·888. It is an oxidized oil or a hydrocarbon (C_{20} H_{16}) containing a species of camphor (C_{20} H_{16} O_2) in solution.

Off. Prep. Spiritus Rosmarini. Spirit of Rosemary. [Not officinal in U. S. P.] (English oil of rosemary, one fluid ounce; rectified spirit, nine fluid ounces.) This preparation contains about thirty-one times as much oil of rosemary as Spiritus Rosmarini. *Lond.* 1851.

The oil of rosemary is contained also in Tinct. Lavand. comp. and Linimentum saponis.

Therapeutics. A powerful stimulant; useful in hysteria, and nervous headaches; externally it is used as a rubefacient and for its odour.

Dose. Of the oil, 1 min. to 5 min.; of the spirit, 10 min. to 50 min., or more.

Lavandulæ Oleum. English Oil of Lavender. The oil distilled in England from the flower of Lavandula vera or Common Lavender; Lin. Syst., Diandria monogynia; a native of Southern Europe; much cultivated in gardens in Surrey. Oil of Spike (French Lavender) is often used in lieu of the English oil.

Description, Prop. & Comp. Oil of Lavender, which gives the odour and taste to the plant, is of a pale yellow colour, and a hot bitter aromatic taste. Sp. gr. 0·877. It is an oxidized volatile oil or a hydrocarbon (C_{20} H_{16}) containing a camphor (C_{20} H_{16} O_2) dissolved in it.

Off. Prep. Spiritus Lavandulæ. Spirit of Lavender. (English oil of lavender, one fluid ounce; rectified spirit, nine fluid ounces.) [Fresh lavender, twenty-four troy ounces; alcohol, eight pints; water, two pints. Distil eight pints. U. S.]

Tinctura Lavandulæ Composita. Compound Tincture of Lavender. (Oil of lavender, one fluid drachm and a half; oil of rosemary, ten minims; cinnamon and nutmeg, bruised, each one hundred and fifty grains; red sandalwood, three hundred grains; rectified spirit, forty fluid ounces. Prepared by maceration.) [Spiritus Lavandulæ Compositus. Compound Spirits of Lavender. U. S. Oil of lavender, a fluid ounce; oil of rosemary, two fluid drachms; cinnamon, in powder, two troy ounces; cloves, in powder, half a troy ounce; nutmeg, in powder, a troy ounce; red saunders, in powder, three hundred and sixty grains; alcohol, six pints; water, two pints; diluted alcohol, a sufficient quantity. The oils are dissolved in the alcohol, the water added; the mixed powders are percolated with this fluid, and sufficient diluted alcohol to make the percolate amount to eight pints.]

Oil of lavender is contained also in lin. camphor. comp.

Therapeutics. Oil of lavender is stimulant and carminative; used in hysteria, hypochondriasis, and other nervous affections, also in flatulence and colic.

Dose. Of the oil, 1 min. to 5 min.; of spirit of lavender, 10 min. to 50 min.; of the compound tincture, 20 min. to 1 fl. drm. or more.

Adulteration. Oil of spike is sometimes mixed or substituted for the true oil of lavender; oil of turpentine is also mixed with it.

Menthæ Piperitæ Oleum. English Oil of Peppermint. The oil distilled in England from the fresh flowering plant of Mentha Piperita, Peppermint; Lin. Syst., Didynamia gymnospermia; indigenous, growing in damp places.

Prop. & Comp. The peppermint plant owes its virtues to the presence of the *Volatile oil*, which is colourless or pale-yellow, having the odour of peppermint, with a warm aromatic taste, succeeded by a sensation of coldness in the mouth. Sp. gr. 0·92. It is an oxidized volatile oil, or a hydrocarbon (C_{20} H_{18}) containing a camphor (C_{20} H_{18} + 2 HO) dissolved in it.

Off. Prep. Aqua Menthæ Piperitæ. Peppermint Water. (English oil of peppermint, one fluid drachm and a half; water, one gallon and a half; distil one gallon). [Oil of peppermint, half a fluid drachm; carbonate of magnesia, sixty grains; distil-

led water, two pints. Rub the oil with the magnesia, then with the water, and filter. U. S.]

Spiritus Menthæ Piperitæ. Spirit of Peppermint. (English oil of peppermint, one fluid ounce; rectified spirit, nine fluid ounces.) This spirit contains about forty-seven times as much oil of peppermint as spiritus menthæ piperitæ. *Lond.* [Oil of peppermint, a fluid ounce; peppermint, in powder, one hundred and twenty grains; stronger alcohol, fifteen fluid ounces. U. S.]

Therapeutics. Oil of peppermint is stimulant and carminative; used as an adjunct to purgatives, to correct flatulency, &c.

Dose. Of the oil, 1 min. to 5 min.; of the aqua menthæ pip., 1 fl. oz. to 2 fl. oz. of spirit. menthæ pip., 5 min. to 50 min.

Menthæ Viridis Oleum. English Oil of Spearmint. The oil distilled in England from the fresh herb when in flower of Mentha viridis, Spearmint; Lin. Syst., Didynamia gymnospermia; indigenous, growing in marshy places.

Prop. & Comp. The plant owes its virtues to the *Volatile oil.* which is colourless or pale yellow with the odour and taste of spearmint, sp. gr. 0·914. It is an oxidized volatile oil or a hydrocarbon (C_{20} H_{10} O_2), containing a camphor in solution.

Off. Prep. Aqua Menthæ Viridis. Spearmint Water. (English oil of spearmint, one fluid drachm and a half; water, one gallon and a half. Distil one gallon.) [Oil of spearmint, half a fluid drachm; carbonate of magnesia, six grains; distilled water, two pints. Rub the oil with the magnesia, then with the water, and filter. U. S.]

[Spiritus Menthæ Viridis. Spirit of Spearmint. U. S. Oil of spearmint, a fluid ounce; spearmint, in coarse powder, one hundred and twenty grains; stronger alcohol, fifteen fluid ounces.]

Therapeutics. Spearmint oil is stimulant and carminative; and is used as an adjunct to purgative medicines, to correct flatulency, &c.

Dose. Of the oil, 1 min. to 5 min.; of aqua menthæ viridis, 1 fl. oz. to 2 fl. oz.

Pulegii Oleum. Oil of Pennyroyal. (Not officinal.) The oil distilled from the flowering plant of Mentha Pulegium, or Pennyroyal; Lin. Syst., Didynamia gymnospermia; indigenous, growing in marshy places.

Prop. & Comp. Oil of Pulegium, is yellowish, sp. gr. 0·95. It is an oxidized oil or hydrocarbon, containing a camphor in solution.

Therapeutics. As oil of mentha piperita, and mentha viridis.

Dose. The same as the oil of mentha piperita, and mentha viridis.

Two other plants belonging to this order, namely, ORIGANUM VULGARE, the Common Marjoram, containing a volatile oil, and possessing properties similar to those of Rosmarinus; and MARRUBIUM VULGARE, or Horehound, possessing a bitter principle as well as a volatile oil, were formerly contained in the Pharmacopœia; the latter is still used in domestic medicine as a tonic, expectorant, and alterative, in phthisis, chronic hepatitis, and in cachexia from various causes.

SUB-CLASS IV. APETALÆ.

POLYGONACEÆ.

Rheum. Rhubarb. The root of an undetermined species of Rheum; Lin. Syst., Enneandria monogynia; growing in Chinese Thibet and Tartary. This definition includes the Russian, the East Indian and Dutch-trimmed or Batavian rhubarbs. Many species of Rheum are known to botanists, but although great exertions have been made, as yet the species yielding the Chinese rhubarb has not been discovered.

Description. *Russian* or so-called *Turkey* rhubarb occurs in irregular-shaped, flat, or cylindrical, angular pieces, the cortex having been removed by slicing; externally it is smooth and yellow and not turned brown by boracic acid; the texture is compact; the fracture uneven, and marbled red and grey; the powder is bright buff-yellow, and the odour rather aromatic; taste astringent and disagreeable; it feels gritty, and tinges the saliva bright yellow; the pieces have generally a hole drilled in them.

East Indian, or half-trimmed rhubarb, differs from the last in not being angular, but slightly rounded, with adhering portions of

the cortex, as if it had been scraped and sliced; externally it is red and veined, not covered with yellow powder, as the Russian variety; also denser, with a smoother fracture, less gritty, and the powder of a redder hue.

Another variety is called *Dutch-trimmed* or *Batavian* rhubarb; in round or flattened pieces, angular, and drilled with a hole; probably of the same origin as the Russian.

Besides these officinal varieties, others are met with, as the *Himalayan*, *Canton stick*, and *English* rhubarb. Some of the Himalayan, according to Dr. Royle, is yielded by *Rheum Emodi*, *Morecroftianum* and *Webbianum*; the English variety is derived from *Rheum Rhaponticum*, and grows near Banbury.

Prop. & Comp. Rhubarb contains a principle, *Rheine* or *Chrysophanic acid*, which occurs in crystalline needles of a golden yellow, metallic lustre (C_{20} H_8 O_6), sparingly soluble in water, freely so in alkaline solutions, which are of a reddish-brown colour; rheine is soluble also in hot alcohol and ether. Various resins have been also obtained from Rhubarb; but although numerous analyses have been made, the peculiar purgative principle has not yet been isolated. Rhubarb yields its active properties to boiling water, also to alcohol. Crystals of oxalate of lime are found in it in considerable quantities, forming at times in the Russian variety, in which they are most numerous, as much as 35 per cent. of the drug.

Off. Prep. Extractum Rhei. Extract of Rhubarb. (Prepared by macerating one pound of rhubarb in five pints of water and ten fluid ounces of rectified spirit, and subsequent evaporation of the solution at a temperature not above 160°.)

[Extractum Rhei Alcoholicum. Alcoholic Extract of Rhubarb. U. S. Rhubarb, twelve troy ounces; alcohol, a pint; diluted alcohol, a sufficient quantity. A tincture is obtained by percolation, and evaporated at a temperature not exceeding 160° to form an extract.]

Infusum Rhei. Infusion of Rhubarb. (Sliced rhubarb, quarter of an ounce; boiling distilled water, ten fluid ounces.) [Bruised rhubarb, one hundred and twenty grains; boiling water, half a pint. U. S.]

Pilula Rhei Composita. Compound Rhubarb Pill. (Rhu-

barb, powdered, three ounces; socotrine aloes, powdered, two ounces and a quarter; myrrh, finely powdered, one ounce and a half; hard soap, one ounce and a half; English oil of peppermint, one and a half fluid drachms; treacle, by weight, four ounces.) [Rhubarb, in powder, a troy ounce; socotrine aloes, in powder, three hundred and sixty grains; myrrh, in powder, half a troy ounce; oil of peppermint, half a fluid drachm. Beat them with water so as to form a pilular mass, to be divided into two hundred and forty pills. U. S.]

PULVIS RHEI COMPOSITUS. Compound Rhubarb Powder. (Gregory's Powder.) (Rhubarb, two ounces; light magnesia, [magnesia. U. S.] six ounces; ginger, one ounce.)

TINCTURA RHEI. Tincture of Rhubarb. (Rhubarb, two ounces; cardamons, quarter of an ounce; coriander, quarter of an ounce; saffron, quarter of an ounce; proof spirit, twenty fluid ounces. Made by maceration and percolation.)

[Rhubarb, three troy ounces; cardamom, half a troy ounce; diluted alcohol, a sufficient quantity. Two pints of tincture are obtained by percolation. U. S.]

Therapeutics. Rhubarb acts as a stomachic and slight astringent in small doses; as a purgative, in larger ones. Its purgative action is generally followed by constipation, dependent on its astringent constituents; it differs from many cathartics in not causing irritation of the alimentary canal. The urine becomes coloured by it, as also do the perspiration and the milk. In consequence of its purgative properties it is often used at the commencement of diarrhœa depending on the presence of irritant matter in the canal, which is thus expelled, and the subsequent astringent effect afterwards exercised proves very valuable. It is frequently combined with magnesia, especially when given to children, as in the form of Gregory's powder. In cases of atonic dyspepsia, attended with some constipation, it is a valuable remedial agent; but if prescribed in cases of habitual constipation, should be combined with some other laxative. In scrofulous children it is sometimes useful, combined with a mercurial alterative, aiding and giving tone to the digestive organs, &c. Externally it has been applied to indolent ulcers.

Dose. Of powdered rhubarb, 1 gr. to 5 gr. as a stomachic; 10 gr. to 30 gr. as a purgative; of infusion, 1 fl. oz. to 2 fl. oz.; of the tincture, as a stomachic, 1 fl. drm. to 2 fl. drm.; as a purgative, ½ fl. oz. to 1 fl. oz.; of compound rhubarb pill, 10 gr. to 20 gr.; of the compound powder, 5 gr. to 10 gr. for children; for an adult, 20 gr. to 60 gr. and upwards.

Adulterations. Rhubarb is very often extensively adulterated. Inferior varieties of rhubarb, as the English, are substituted for the Russian, &c. If turmeric be present, it is reddened by boracic acid, which has no such effect upon the colouring matter of rhubarb. In English rhubarb the starch is generally in excess, the oxalate of lime in small amounts only; the proportions of these ingredients are reversed in the Chinese varieties.

MYRISTACEÆ.

Myristica. Nutmeg. The kernel of the seed of Myristica Officinalis. [The kernel of the fruit of Myristica Fragrans, U.S.] Lin. Syst., Diœcia monodelphia; imported from Sumatra and the Molucca Islands.

Myristicæ Adeps. Concrete Oil of Nutmeg. [Not officinal in U. S. P.] A concrete oil obtained from nutmegs by expression and heat.

Myristicæ Oleum. Volatile Oil of Nutmeg. The oil distilled in England from the nutmeg.

Description. The *nutmeg* is of a spheroidal shape, resembling that of a small bird's egg, about an inch in length, externally marked with reticulated furrows, greyish red internally, with dark brownish veins; it has a peculiar odour and a bitter aromatic taste. The cut surface presents a mottled appearance, produced by numerous veins in which the oil is situated. The *concrete oil*, or fat, is of a firm consistence, an orange colour, and has the odour of the nutmeg. The *volatile oil*, obtained by distillation, is colourless or of a straw yellow colour, with the odour and taste of the nutmeg.

Prop. & Comp. By expression nutmegs yield about 30 per cent. of the concrete oil, soluble in four times its weight of boiling alcohol, and half that quantity of ether, consisting of a *fixed oil* or *fat*, united with a *volatile oil*, which last has a sp. gr. 0·95, and is

the same as that obtained by distillation. The fixed fat yields a peculiar acid, myristic acid (HO, C_{28}, H_{27}, O_3), crystallizing in silky needles. Nutmeg contains, besides these principles, woody fibre, and the ordinary constituents of seeds.

Off. Prep.—Of Nutmeg. Nutmeg is one of the ingredients of the aromatic powder, and the compound tincture of lavender.

Of the Concrete Oil. This is used in the preparation of the pitch plaster.

Of the Volatile Oil. Spiritus Myristicæ. Spirit of Nutmeg. (Volatile oil of nutmeg, one fluid ounce; rectified spirit, nine fluid ounces.) [Nutmeg, bruised, two troy ounces; diluted alcohol, eight pints; water, a pint. Distil eight pints. U. S.]

Volatile oil of nutmeg also forms one of the ingredients of aromatic spirit of ammonia.

Therapeutics. Nutmeg is an aromatic and gentle stimulant. In very large doses it is said to possess narcotic properties. It is perhaps more frequently used for giving flavour to farinaceous and other articles of food, than for its medicinal properties. Applied externally, it acts as a topical stimulant.

Dose. Of nutmeg in powder, 5 gr. to 15 gr.; of the volatile oil, 1 min. to 5 min.; of the spiritus myristicæ, 10 min. to 50 min.

LAURACEÆ.

Cinnamomum. Cinnamon. The inner bark of shoots from the truncated stocks of Cinnamomum Zeylanicum, or Cinnamon; Lin. Syst., Enneandria monogynia; growing chiefly in Ceylon, and distinguished in commerce as Ceylon cinnamon. [The bark of Cinnamomum Zeylanicum and Cinnamomum Aromaticum. U. S.]

Cinnamomi Oleum. The Oil of Cinnamon, distilled from cinnamon, imported from Ceylon. [The volatile oil obtained from the bark of Cinnamomum Zeylanicum. U. S.]

Description. Cinnamon bark is about $\frac{1}{2}$th of a line in thickness, in closely-rolled quills, which are about 4 lines in diameter, containing several small quills within them; the colour is a characteristic brown; brittle, and with a splintery fracture; it has an aromatic odour, and warm astringent taste. The *oil* is of a bright yellow colour, with the odour and taste of the bark, but it gradually becomes red; it is heavier than water.

Prop. & Cpmp. The bark owes its important properties to the *oil*, but besides this oil, *tannic acid* is present in notable quantities, also *resin*, and *cinnamic acid*, &c. The essential part of oil of cinnamon has a composition represented by the formula (C_{18} H_7 O_2 H) or a hydride of cinnamyl; but there is likewise a hydrocarbon (C_{20} H_{16}) in small amounts. Hydride of cinnamyl, when treated with hydrate of potash, is resolved into cinnamic acid (HO, C_{18} H_7, O_3) and hydrogen; and when exposed to the air, it gradually absorbs oxygen with the formation of cinnamic acid and a resin; both of which products of decomposition, as above stated, are found in the bark.

Off. Prep.—Of the Bark. Aqua Cinnamomi. Cinnamon Water. (Cinnamon, bruised, twenty ounces; water, two gallons. Distil one gallon.) [Oil of cinnamon, half a fluid drachm; carbonate of magnesia, sixty grains; distilled water, two pints. Rub the oil with the carbonate of magnesia, then with the water. U. S.]

Pulvis Aromaticus. Aromatic Powder. (Cinnamon, nutmeg, and saffron, of each three ounces; cloves, one ounce and a half; cardamoms, free from their capsules, one ounce; refined sugar, twenty-five ounces.) [Cinnamon, ginger, each in fine powder, two troy ounces; cardamom, deprived of the capsules, nutmeg, each in fine powder, a troy ounce. U. S.]

Pulvis Cinnamomi Compositus, *Lond.* 1851. Compound Cinnamon Powder. (Cinnamon, two ounces; cardamoms, one ounce and a half; ginger, one ounce; long pepper, half an ounce. Rub together to a very fine powder.)

Tinctura Cinnamomi. Tincture of Cinnamon. (Cinnamon, in coarse powder, two ounces and a half; proof spirit, 20 fluid ounces. Prepared by maceration and percolation.)

Cinnamon bark is also contained in the compound tincture of lavender.

Therapeutics. Cinnamon is stimulant, aromatic, and carminative, also somewhat astringent; useful as an adjunct in diarrhœa. The oil may be employed in flatulence, and as a corrigent to purgatives.

Dose. Of the powdered bark, 10 gr. to 30 gr.; of aqua cinnamomi, 1 fl. oz. to 2 fl. oz.; of pulv. aromaticus, 10 gr. to 30 gr.;

of the tincture, 1 fl. drm. to 2 fl. drm.; of oleum cinnamomi, 1 min. to 5 min.

Adulteration. The bark called Cassia, or Chinese Cinnamon (from Cinnamomum Cassiæ), is detected by its greater thickness and roughness, and less aromatic odour and taste.

Camphora. Camphor. A concrete volatile oil, prepared by sublimation of the wood of Camphora officinarum, and resublimed in England, in bell-shaped masses. Lin. Syst., Enneandria monogynia; Rough camphor is imported from China.

Description. Camphor is usually sublimed in the form of hollow hemispherical cakes, and these are broken into small masses, which are crystalline, white, semitransparent and tough, with a peculiar odour and taste, at first pungent, followed by a sensation of cold. Crude camphor, as imported, is in the form of small crystalline grains, of a dirty white colour; this is mixed with lime before it is sublimed.

Prop. & Comp. Camphor is rather tough and difficult to pulverize, except when a few drops of spirit are added: sp. gr. 0·98. It is soluble in alcohol, ether, the volatile and fixed oils; little so in water, yet sufficient is taken up to give a strong taste and odour to that liquid; it sublimes entirely when heated. It has the nature of a concrete volatile oil, and its formula is (C_{20} H_{16} O_2). Boiling point 399°. It is changed into camphoric acid by nitric acid.

Off. Prep. Aqua Camphoræ. Camphor water.

Synonym. Mistura Camphoræ. (Camphor, broken into pieces, half an ounce; distilled water, one gallon.) [Camphor, one hundred and twenty grains; alcohol, forty minims; carbonate of magnesia, half a troy ounce; distilled water, two pints. Rub the camphor first with alcohol, then with the carbonate of magnesia, and lastly with the water. U. S.]

Linimentum Camphoræ. Camphor Liniment. (Camphor, one ounce; olive oil, four fluid ounces.)

Linimentum Camphoræ Compositum. Compound Liniment of Camphor. (Camphor, two ounces and a half; English oil of lavender, one fluid drachm; strong solution of ammonia, five fluid ounces; rectified spirit, fifteen fluid ounces.) [Not officinal in U. S. P.]

Spiritus Camphoræ. Spirit of Camphor. (Camphor, one fluid

ounce; rectified spirit, nine fluid ounces.) [Camphor, four troy ounces; alcohol, two pints. U. S.]

Tinctura Camphoræ cum Opio. Camphorated Tincture of Opium. (Opium, in coarse powder, forty grains; benzoic acid, forty grains; camphor, thirty grains; oil of anise, half a fluid drachm; proof spirit, a pint; one fluid drachm contains a quarter of a grain of opium.)

Linimentum Saponis. Liniment of soap also contains camphor.

Therapeutics. Stimulant at first, afterwards sedative; its action is exerted on the brain and nervous system, also upon the skin and mucous membranes. Externally it acts as a stimulant. Used in mania and melancholia as a calmative; in hysterical and other spasmodic nervous affections as an anti-spasmodic; in painful affections of the urinary organs, and dysmenorrhœa, as a sedative; and in febrile conditions, the exanthemata, rheumatism, &c., as a diaphoretic. Externally, it is employed to stiff and painful parts.

Dose. Of camphor, 5 gr. upwards; of camphor water, 1 fl. oz. to 3 fl. oz.; of the spirit, 10 min. to 30 min., suspended in water (which precipitates it) by means of mucilage; of the tincture of camphor with opium, or camphorated tincture of opium, 1 fl. drm. upwards.

Adulteration. Camphor is not often adulterated, but another kind, called Borneo Camphor, from Dryobalanops Camphora, a guttiferous plant, is sometimes met with; heavier than water, less volatile, and more opaque than true camphor. An artificial camphor can be made by passing hydrochloric acid gas through volatile oil of turpentine.

Sassafras. Sassafras. [Sassafras Radicis Cortex. The bark of the root. U. S.] The dried root of Sassafras Officinale, or Sassafras tree; Lin. Syst., Enneandria monogynia; growing in the United States and Canada.

Description. In branched pieces, sometimes eight inches in diameter at the crown, the wood, light and spongy, of a pale grayish-brown colour; the bark, dark reddish-brown, also spongy; odour agreeable; taste warm, sweet, and aromatic; the bark is more powerful than the wood, it is also met with in chips.

Prop. & Comp. Sassafras root contains a *volatile oil*, *resin*, and a principle called *sassafrin*, with a little tannin, &c.

Off. Prep. It is contained in Decoctum Sarsæ Compositum.

Therapeutics. A stimulant and diaphoretic, seldom given alone; used in chronic rheumatism, skin diseases, and syphilis. The volatile oil, Oleum Sassafras, may be employed.

Dose. Of the oil, 1 min. to 5 min.

Laurus. Sweet Bayberry (not officinal). The fruit of Laurus nobilis, or Sweet Bay; Lin. Syst., Enneandria monogynia; growing in the South of Europe, cultivated in this country.

Description. The fruit is ovoid, about the size of a small cherry, wrinkled; dark brown or purple colour; consisting of a friable sarcocarp, including two oval fatty cotyledons; the odour is aromatic, and the taste warm. Bayberry leaves were formerly used in medicine; they are still employed by the confectioner.

Prop. & Comp. Bayberries contain a *volatile oil*, together with a *fixed fatty oil*; when pressed, both these are separated, and called Oil of Bays.

Therapeutics. Slightly stimulant and aromatic.

Adulteration. It is worthy of note, that the leaves of Laurus Cerasus, or Cherry Laurel, order Amygdalaceæ, yielding prussic acid, have been occasionally substituted for the bay-laurel leaf, a dangerous exchange.

Nectandra. Bebeeru Bark. The Bark of Nectandra Rodiæi, the Green-heart Tree. The bark imported from British Guiana.

Beberiæ Sulpas. Sulphate of Beberia. The sulphate of an alkaloid, prepared from the Bebeeru bark.

Description. The bark is found in large flat pieces, from one to two feet long, from two to six inches broad, and about a quarter of an inch thick, heavy, hard and fibrous; of a grayish-brown colour externally, reddish or cinnamon brown within; taste very bitter, with some astringency.

Prop. & Comp. Bebeeru bark contains an alkaloid, not yet crystallized, Beberia or Bibirine (C_{38} H_{21} N O_6), a yellow resinous-looking body; soluble in alcohol, slightly in ether, scarcely in water; it forms salts with acids; the commercial and officinal salt is the impure sulphate which occurs in dark brown, thin, translucent scales, yellow when powdered, with a strong bitter taste, soluble

in water and alcohol. Composition ($C_{38}H_{21}NO_6, SO_3$). Its watery solution gives a white precipitate with chloride of barium, and with caustic soda a yellowish white precipitate which is dissolved by agitating the mixture with twice its volume of ether. The etherial solution separated by a pipette and evaporated, leaves a yellow translucent residue, entirely soluble in dilute acids. It leaves no ash when burnt; water forms with it a clear brown solution.

Off. Prep. Sulphate of Beberia. [Not officinal in U. S. P.] Sulphate of beberia is prepared by exhausting the powdered bark by maceration and percolation with water, strongly acidulated with sulphuric acid. The colouring and other matters are then precipitated from this solution by mixing it with milk of lime (not sufficient to render the fluid alkaline), and the deposit separated by filtration. To the filtered solution ammonia is added until the fluid has a faint ammoniacal odour, the precipitate which forms is collected on a cloth, squeezed and dried in a vapour bath. The precipitate is powdered and exhausted by repeated boiling with rectified spirit and to the solution water is added, and the spirit recovered by distillation; the residue is treated with dilute sulphuric acid, till the fluid becomes slightly acid, it is then evaporated to dryness on a water bath, pulverized and the powder treated with cold water, which dissolves the sulphate of beberia, the solution is evaporated to a syrupy consistence, and spread in thin layers on flat porcelain or glass plates, and dried at a heat not exceeding 140°. It should be preserved in well-stoppered bottles.

Therapeutics. The bark is seldom given; the sulphate of beberia is tonic and antiperiodic; used in debility and periodic affections, it has been found but an imperfect substitute for quinine.

Dose. Of the sulphate of beberia, 2 gr. to 10 gr.

ARISTOLOCHIÆ.

Serpentaria. Serpentary. The dried root of Aristolochia Serpentaria, Serpentary, or Virginian Snake-root; Lin. Syst., Gynandria hexandria; grown in Virginia and other parts of the United States.

Description. A small root-stock with numerous small radicles, about three inches long, of a pale grayish-brown colour; aromatic and camphoraceous odour, and bitter camphoraceous taste.

Prop. & Comp. Serpentary contains a *volatile oil* and *resin;* also a *bitter extractive* matter; the latter soluble in water, the former in spirit.

Off. Prep. Infusum Serpentariæ. Infusion of Serpentary. (Serpentary, a quarter of an ounce. Boiling distilled water, ten fluid ounces.) [A pint of infusion is prepared by percolation from half a troy ounce of powdered root, or by maceration for two hours with boiling water. U. S.]

Tinctura Serpentariæ. Tincture of Serpentary. (Serpentary, bruised, two ounces and a half. Proof spirit, twenty fluid ounces. Prepared by maceration and percolation.)

Serpentary is contained also in Tinct. Cinchonæ Comp.

Therapeutics. A stimulant and tonic: also diaphoretic and diuretic. It is sometimes used in atonic dyspepsia, chronic rheumatism, in low febrile states, and to promote eruption in the exanthemata.

Dose. Of the powdered root, 10 gr. to 20 gr. or more; of the infusion, 1 fl. oz. to 2 fl. oz.; of the tincture, ½ fl. drm. to 1½ fl. drm.

Asarum Europæum, or Asarabacca, belongs to this order; the leaves were formerly used as an errhine: they cause powerful vomiting and purging when administered internally.

THYMELACEÆ.

Mezereum. Mezereon. The dried bark of Daphne Mezereum, or Mezereon; Lin. Syst., Octandria monogynia; or Daphne Laureola. The Spurge Laurel. The latter is chiefly found in commerce; indigenous.

Description. Thin, flat, or curled pieces of various lengths; tough, of a brown colour outside, but white and fibrous within, with slight odour, taste hot and very acrid.

Prop. & Comp. An *acrid volatile oil*, *acrid resin*, and a crystalline principle, *daphnin*. When the root is boiled in water, an acrid vapour rises.

Off. Prep. It is contained in Decoctum Sarsæ Compositum.

Therapeutics. Mezereon is a powerful local irritant, and even vesicant; it causes vomiting and purging in large doses, but in small ones, diaphoresis and diuresis. Used in chronic rheumatism, syphilis, scrofulous and skin diseases. Seldom given in this country, except in the compound decoction of sarsaparilla. In America an ointment is used.

Dose. Of compound decoction of sarsaparilla, 1 fl. oz. to 2 fl. oz. or more.

EUPHORBIACEÆ.

Cascarilla. Cascarilla. The bark of Croton Eleuteria, or Cascarilla bush; Lin. Syst., Monœcia monodelphia: growing in the Bahamas.

Description. In small quilled pieces, from 2 to 4 inches long, and from 2 to 5 lines in diameter; about the size of a pencil, fissured in both directions, of a dull brown colour, but spotted white with crustaceous lichens; short fracture; sometimes it occurs in small flattened pieces without lichens.

Prop. & Comp. Odour spicy and pleasant, taste bitter and aromatic, its properties are yielded to water and spirit. It emits a fragrant odour when burned. The bark contains a bitter matter, in which a crystalline substance, *Cascarilline*, has been stated to exist; besides which, there are at present some tannic acid, colouring matter, and a *volatile oil.*

Off. Prep. Infusum Cascarillæ. Infusion of Cascarilla. (Cascarilla, in coarse powder, one ounce; boiling distilled water, ten fluid ounces.) [A pint of infusion is made from a troy ounce of cascarilla, in powder, by percolation, or by maceration, with boiling water. U. S.]

Tinctura Cascarillæ. Tincture of Cascarilla. [Not officinal in U. S. P.] (Cascarilla, bruised, two ounces and a half; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.)

Therapeutics. Cascarilla is an aromatic stomachic and tonic, useful in atonic dyspepsia, and in recovery from acute diseases; it seems also to possess antiperiodic powers, but is much less

powerful than Cinchona, and is now seldom employed in intermittents.

Doses. Of powdered bark, 10 gr. to 30 gr.; of the infusion 1 fl. oz. to 2 fl. oz.; of the tincture, ½ fl. drm. to 1½ fl. drm.

Oleum Crotonis. [Oleum Tiglii. U. S.] Croton Oil. The Oil expressed in England from the seed of Croton Tiglium [the oil obtained from the seeds of Croton Tiglium. U. S.]; Lin. Syst., Monœcia monodelphia; growing in the East Indies.

Description. The oil is slightly viscid, from pale yellow to brownish-yellow in colour, of a disagreeable odour and acrid taste. The seeds from which the oil is expressed are smaller and duller in appearance, but otherwise much resemble castor oil seeds. The kernels yield from 50 to 60 per cent. of oil.

Prop. & Comp. Croton oil contains a volatile oily acid, *Crotonic acid* (not active), and a fixed oil. It is soluble in ether and volatile oils; agitated with its own volume of alcohol, and gently heated, it forms a clear solution from which about three-fourths of the oil separate on cooling.

Off. Prep. Linimentum Crotonis. Liniment of Croton Oil. [Not officinal in U. S. P.] (Croton oil, half a fluid ounce; olive oil, three fluid ounces and a half.)

Therapeutics. A most powerful irritant, drastic, purgative, often causing nausea and vomiting; used in obstinate constipation and cerebral affections, as apoplexy; also in very minute quantities as an ordinary purgative. Externally it gives rise to pustulation, and diluted with olive oil or soap liniment, is a valuable counter-irritant.

Dose. Of the oil, ½ min. to 2 min., placed on the tongue; or formed into a pill with crumb of bread. As an adjunct, ½ min. upwards.

Adulteration. Other fixed oils, as castor oil, might be added, which would be difficult to detect.

Ricini Oleum. Castor Oil. The oil (expressed in England or imported from America) from the seed of Ricinus Communis, the Castor Oil plant; Lin. Syst., Monœcia monodelphia; growing in the East Indies and America.

Description. The oil is thick, viscid, colourless, or a pale

straw-yellow, of peculiar odour, and slightly acrid taste. The seeds, about the size of small beans, are oval, compressed, obtuse at the ends, smooth and shining on the surface, of a light ash colour, marbled with dark spots and veins.

Prop. & Comp. Castor Oil differs from most other fixed oils in being entirely soluble in one volume of alcohol and two volumes of rectified spirit; sp. gr. 0·96; it contains three oily acids, *Ricinic*, *Ricin-oleic*, and *Ricin-stearic*, united with *Glycerine*. It also contains some acrid resinous matter.

Therapeutics. A mild, yet quick, purgative medicine; causing little or no disturbance of the system; only the evacuation of the contents of the bowels. Used in delicate subjects, and in irritable conditions of the alimentary canal, and neighboring parts: as in gastritis, enteritis, dysentery, and cystitis, &c. The seeds are very active, even dangerous.

Dose. 1 fl. drm. to 1 fl. oz.; often given floating on some liquid; sometimes in gelatine or membranous capsules; or in the form of an emulsion with some aromatic.

Adulteration. Other fixed oils, difficult to detect, as, when mixed, they are rendered, to some extent, soluble in alcohol.

Kamela. Kamela Wurrus. The powder which adheres to the capsules of Rottlera tinctoria.

Prop. & Comp. An orange red granular powder, scarcely mixing with water, but for the most part soluble, and forming a red-coloured solution with alcohol and ether. The insoluble residue consists chiefly of tufted hairs. Composition unknown, probably of a resinous nature.

Therapeutics. A powerful anthelmintic, found very efficacious in India in the treatment of tape-worm. It usually purges freely.

Dose. 60 gr. to 120 gr. in honey or thick gruel.

In this order are also contained the—

Euphorbium Officinarum, yielding the resin in whitish tears called *Euphorbium*, a very powerful local irritant, used sometimes as a sternutatory, causing violent vomiting and purging when swallowed; also the *Janipha* or *Jatropha Manihot*, of which the fecula of the root, when dried and heated, forms *Tapioca*. Cassava bread is also made from the root; the juice of the tree, when fresh, is acrid and poisonous. Tapioca is a pure form of starch, and is much used as an article of diet.

PIPERACEÆ.

Piper. Black Pepper. The unripe berries, dried, of Piper Nigrum, or Black Pepper; Lin. Syst., Diandria trigynia; growing in tropical countries, as Java and Sumatra, now chiefly imported from the West Indies.

Description. A berry about the size of a small pea, black, rough or wrinkled on the outside, the contained seed is grayish; when decorticated it forms *white pepper*.

Prop. & Comp. Odour hot and aromatic; taste acrid; contains a nitrogenized feeble base, *Piperine* ($C_{34}H_{19}NO_6$), in rhomboidal prisms, white, almost tasteless, and inodorous; although the piperine of commerce is always yellow and acrid from the presence of volatile oil. A *volatile oil* ($C_{20}H_{16}$), lighter than water, giving the odour and taste to the drug, is also present: besides the ordinary constituents of such fruits, there exists also some acrid resin.

[*Off. Prep.* Confectio Piperis. Confection of Pepper. [Not officinal in U. S. P.] (Black pepper, two ounces; caraway, three ounces; clarified honey, fifteen ounces, rubbed well together.)

This preparation is a substitute for a nostrum long known as Ward's Paste, and much used in the treatment of piles.

Therapeutics. Pepper is chiefly used as a condiment. It acts as a stimulant stomachic, and appears to influence the mucous membrane of the rectum, hence its value in hæmorrhoids; it also acts on the urethral membrane, and may be used as a substitute for cubebs in gonorrhœa, &c. Piperine probably possesses antiperiodic powers, and is stated to have been used with success in agues. Externally, pepper, or its oil, may be employed as a rubefacient; the oil is sometimes applied topically in relaxed sore throat.

Dose. Of pepper, 5 gr. to 20 gr.; of piperine, 5 gr. upwards; of the confection, 40 gr. to 120 gr. and upwards.

Piper Longum. The unripe fruit of Piper Longum, or Chavica Roxburghii [Not officinal in U. S. P.]; Lin. Syst., Diandria trigynia. It is not now officinal, but is sometimes used as a condiment.

Description. The spikes are from one to two inches in length,

and studded with eminences arranged spirally; of a light gray colour.

Prop. & Comp. As black pepper; the odour being rather different.

Therapeutics and Dose. The same as of black pepper.

Cubeba. Cubebs. The unripe fruit, dried, of Cubeba Officinalis, the Cubeb Pepper; Lin. Syst., Diandria trigynia: cultivated in Java.

Oleum Cubebæ. Oil of Cubebs. The oil, distilled in England from Cubebs.

[Oleoresina Cubebæ. Oleo-resin of Cubebs. U. S. Prepared by percolation with ether; the larger part of the ether is recovered by distillation in a water-bath, and the remainder is evaporated.]

Description. Very like black pepper, but having small stalks or tails attached, which serve to distinguish them; they are also lighter in colour.

Prop. & Comp. Cubeb pepper has an odour like camphor, in addition to that of pepper; its taste is hot and spicy; it contains *Cubebine*, which by some is said to be the same as piperine; but this is doubtful; the *volatile oil* is colourless or pale greenish yellow, with the odour and taste of cubebs (C_{30} H_{24}). There is also some *resin* or oxidized oil in cubeb pepper.

Therapeutics. Cubebs and the oil are used almost exclusively for their action on the mucous membrane of the urethra and bladder, upon which they act as stimulants, and have the power of arresting abnormal discharges.

Dose. Of the powder 20 gr. to 120 gr.; of the volatile oil, 5 min. to 20 min.

Matica. [Matico. U. S.] Matico. The leaves of Artanthe Elongata or Piper Angustifolium, Matico plant; Lin. Syst., Diandria trigynia; a native of Peru.

Description. The leaves are from 2 to 8 inches long, oblong lanceolate, acuminate, tesselated on the upper surface, reticulated and downy beneath; of a green colour, with an aromatic, warm and slighty astringent taste and aromatic odour; as imported, the leaves are mixed with the spikes and stalks, and in a compressed state.

Prop. & Comp. Matico contains traces of tannic acid, and a peculiar acid, named artanthic acid, which is readily crystallizable; soluble in water and alcohol, but remarkably so in ether; nitrate of potash, colouring matter and a volatile oil or camphor (?) not yet isolated are also found in the leaves. No piperine has been obtained from them, and they contain no starch.

Off. Prep. INFUSUM MATICÆ. Infusion of Matico. [Not officinal in U. S. P.] (Matico, cut small, half an ounce; boiling distilled water, ten fluid ounces.)

Therapeutics. The surface of the leaf or the powder applied to bleeding parts, as leech-bites, &c., acts as a powerful styptic; when given internally it is stated to produce astringent effects and to affect the genito-urinary mucous membrane and rectum, like pepper or cubebs; it contains little ordinary astringent matter, and it has been supposed that its power, when applied topically, is due to the mechanical structure of the leaf.

Dose. Of powder, internally, 30 gr. to 60 gr.; of infusion, 1 fl. oz. to 2 fl. oz.

SALICACEÆ.

Salicis Cortex. Willow Bark. Bark of Salix Caprea; Lin. Syst., Diœcia diandria; indigenous. Not officinal.

Description. The bark obtained from the branches is quilled, the epidermis dark-coloured, and the structure fibrous and tough; it has a slightly aromatic odour, with a bitter and astringent taste.

Prop. & Comp. Its active matters are soluble in water; it contains *tannin*, gum, extractive matter, and the usual constituents of barks. In addition, it yields a neutral crystalline principle *Salicine*, which, when pure, occurs in white scaly crystals, with a bitter taste, soluble in water and alcohol; and has the composition (C_{26} H_{18} O_{14}). Concentrated sulphuric acid turns Salicine of a bright red colour; and when acted on by oxidizing agents, it is converted into *Salicylous acid*, or hydruret of Salicyle (C_{14} H_5 O_4, H); this is identical with the *oil of Spiræa Ulmaria*, and exhales the same peculiar odour.

Therapeutics. Willow bark is tonic and antiperiodic, and has

been much recommended in intermittents as a substitute for cinchona; it is generally administered as salicine; this is thought to possess considerable antiperiodic power, but is not likely to supersede quina, though useful as a mild bitter tonic, when given in doses from ten grains to twenty grains. A decoction is sometimes useful in chronic skin affections, as psoriasis. Salicine taken internally appears in the urine as the hydruret of salicyle, and causes that fluid to strike purple-red with the persalts of iron.

Dose. Of decoction (1½ oz. to 20 fl. oz.) 1½ fl. oz. to 3 fl. oz.; of salicine, 5 gr. to 30 gr.

ULMACEÆ.

Ulmus. Elm Bark. The dried inner bark of Ulmus Campestris, the broad-leaved Elm; deprived of its outer layers; Lin. Syst., Pentandria monogynia; indigenous to and cultivated in Britain.

Description. Elm bark is of a lightish-brown colour; the pieces are broad, about half a line thick, and of varying lengths, and consist of the bark, deprived of its epidermis and outer layer. It is without smell; taste mucilaginous, slightly bitter and astringent.

Prop. & Comp. It yields its active properties to water, and contains a large amount of mucilage, and about 2·7 per cent. of tannin. *Ulmin*, a peculiar substance, of dark brown colour, insoluble in cold, and but slightly so in boiling water, which it tinges of a brown colour, readily soluble in alkaline solutions, received its name from being first obtained from this bark; it is now thought to be a constituent of many other barks. The decoction is turned green by perchloride of iron, and precipitates with a solution of gelatine.

Prep. Decoctum Ulmi, Lond., 1851. Decoction of Elm. (Bruised elm bark, two ounces; distilled water, two pints.) Boil down to a pint, and strain).

Therapeutics. Elm bark is demulcent, slightly tonic and astringent, and has been recommended in some chronic skin affections, as psoriasis and lepra. Some practitioners think highly of its

powers as an alterative; sometimes diuretic and diaphoretic effects are produced by the use of the decoction.

Dose. Of the decoction, 1 fl. oz. to 2 fl. oz.

[ULMUS FULVA. Slippery Elm. The inner bark of Ulmus fulva. U. S.

The slippery elm bark is simply a demulcent, and is destitute of astringency, and of tonic powers. Powdered it is employed in the formation of cataplasms, and it may be used internally in infusion *ad libitum.*]

CUPULIFERÆ.

Quercus. Oak Bark. The dried bark of the small branches and stems of Quercus Pedunculata, the Common Oak; Lin. Syst., Monœcia polyandria; indigenous. The bark should be collected in spring from plants growing in Britain.

Description. The bark, when dry, occurs in long pieces generally covered with a greyish-white epidermis, of a fibrous consistence, brittle, internally cinnamon coloured, as also is the outer surface, when denuded of the epidermis; the taste is very astringent.

Prop. & Comp. Oak bark yields to water and spirit its active principles, viz., *tannic acid* and *gallic acid;* it also contains *pectin.* The amount of tannic acid varies very much with the age of the branches from which the bark is taken; season, and other circumstances, likewise have an influence upon the amount of astringent matter present in the bark.

Off. Prep. DECOCTUM QUERCUS. Decoction of Oak Bark. (Bruised oak bark, one ounce and a half; distilled water, twenty fluid ounces.)

Therapeutics. Seldom used except as an external astringent, in the form of the decoction, which forms a useful and economical lotion, gargle, or injection, in relaxed sore throat, leucorrhœa, &c. It may be given internally in the cases in which tannin acid is useful.

Dose. Of decoction, 1 fl. oz. to 2 fl. oz., when internally administered.

Galla. Galls. Excrescences occurring on the small twigs of Quercus Infectoria, the Gall or Dyer's Oak, caused by the punctures and deposited ova of Diplolepis Gallæ tinctoriæ. Lin. Syst., Monœcia polyandria; growing chiefly in Asia Minor.

Acidum Tannicum. Tannic Acid. An acid obtained from Galls.

Acidum Gallicum. Gallic acid. An acid prepared from Galls.

Description of the Gall. The punctures of the young twig of the tree by a hymenopterous insect, the *diplolepis gallæ tinctoriæ*, cause an astringent exudation, which concretes and produces the gall-nut; the eggs deposited by the insect become inclosed in the excrescence. Gall-nuts are more or less globular in form, tuberculated on the surface, about the size of a marble, varying from half-an-inch to three-fourths of an inch in diameter. There are two varieties, blue and white galls; the former, heavy, and of a bluish-green tinge, yellowish white within, with a small central cavity; the latter white, of a grayish colour, less astringent, and perforated with a small hole, the passage by which the insect escaped.

Prop. & Comp. Gall-nuts contain a very large amount, about 35 per cent., of *tannic acid*, and 5 per cent. of *gallic acid*, also another body named *ellagic acid*, with gummy and extractive matters, lignin, salts, &c.

Tannic Acid (C_{54} H_{22} O_{34}) is prepared by percolating the powdered galls with a mixture of water and ether, the percolated fluid separates into two strata, the heavier of which, containing the tannic acid in solution, is separated and evaporated to dryness. Tannic acid occurs in the form of a light glistening spongy mass or powder, yellowish, or almost white; uncrystallizable, of a very astringent taste, freely soluble in water and spirit, but very sparingly soluble in ether; slightly acid in reaction; its solutions precipitate gelatine yellowish white, and the persalts of iron bluish-black.

According to the latest researches of Strecker, tannin has the formula (C_{54} H_{22} O_{34}), and by the action of sulphuric acid is resolved into gallic acid and grape sugar. The same change is effected when a strong decoction of the galls is kept for a lengthened

period at a temperature of about 70° or 80° Fah. The formula explaining this decomposition is thus represented by Strecker:

$[(C_{54}\ H_{22}\ O_{34}) + 8HO = 3\ (C_{14}\ H_6\ O_{10}) + (C_{12}\ H_{10}\ O_{10})]$ or one equivalent of tannin and eight of water are resolved into three equivalents of gallic acid and one of grape sugar.

GALLIC ACID ($3\ HO,\ C_{14}\ H_3\ O_7 + 2HO$) is prepared by making powdered galls into a thick paste with water, and keeping them in this state for six weeks at a temperature of between 60° and 70°. This paste is afterwards boiled with distilled water, and strained through calico; the solution is allowed to cool and the crystals which are deposited are collected on a filter and drained by pressure between folds of filtering paper. They are then redissolved in boiling water, the liquid allowed to cool to 80°, and the crystals which separate are washed with ice cold distilled water, and dried at a temperature not exceeding 212°.

Gallic acid occurs in white or pale, fawn coloured, silky, needles, very soluble in boiling water, rectified spirit and ether.

It differs from tannin in not precipitating gelatine, albumen, or the alkaloids, but it strikes bluish-black with the persalts of iron; its taste is acid and astringent, but much less so than that of tannin, perhaps owing to its slight solubility in the saliva. Gallic acid is decomposed by heat, with the formation of *pyrogallic acid* ($C_6\ H_3\ O_3$) and metagallic acid ($C_6\ H_2\ O_2$. The former acid strikes black with proto-salts of iron, and is a powerful deoxidizing agent.

Ellagic acid exists in gall-nuts in small quantities; it forms a white powder, differing from tannin and gallic acid in being almost insoluble in water, alcohol, or ether; it appears to be an isomeric modification of gallic acid. Probably ellagic acid is contained in many vegetables, as some of the intestinal concretions, called *bezoars*, found in the intestines of ruminants, are entirely composed of it.

Off. Prep.—Of Galls.

TINCTURA GALLÆ. Tincture of Galls. (Galls, bruised, two and a half ounces; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.)

UNGUENTUM GALLÆ. Ointment of Galls. (Galls, eighty grains; simple ointment, one ounce.) [Nutgalls in very fine powder, a troy ounce; lard, seven troy ounces. U. S.]

Unguentum Gallæ cum Opio. Ointment of Galls and Opium. [Not officinal in U. S. P.] (Ointment of galls, one ounce: opium in powder, thirty-two grains.)

Of Tannic Acid.

Suppositoria Acidi Tannici. Tannin Suppositories. [Not officinal in U. S. P.] (Tannic acid, twenty-four grains; glycerine, twenty minims; prepared lard and white wax, as much as is required.)

Trochisci Acidi Tannici. Tannin Lozenges. [Not officinal in U. S. P.] (Tannic acid made into lozenges, with tincture of tolu, sugar, gum arabic, mucilage of gum arabic and water.) One and a half grains of tannic acid are contained in each lozenge.

Therapeutics. Gall-nuts owe their efficacy to the tannic and gallic acids contained in them; and the description of the action of these acids applies not only to galls, but to all those vegetables which are made use of for their astringent effects.

Tannic Acid, when applied to a living part, acts as a most powerful astringent; if the surface of a mucous membrane is chosen, this effect is well seen in the contraction of the vessels, and consequent paleness produced. When the lips, or any part of the mouth, come in contact with this acid, the astringency becomes evident to the taste.

Taken internally, tannic acid sometimes causes a sensation of dryness of the mouth and fauces, thirst, and not unfrequently constipation; it soon becomes absorbed into the blood, and after some alteration in composition, is thrown out, or at least partly so, by the kidneys in the form of gallic and pyrogallic acids, and a brownish-black humus-like matter: sometimes the urine becomes quite dark-coloured, especially after it has been exposed to the air for a short time. The urine of patients taking tannic acid does not precipitate gelatine, showing the absence of tannic acid, but strikes black with persalts of iron, indicating the presence of gallic acid. Upon the alimentary canal, and also after absorption, the action of tannin is of the same character; and hence, not only topical but remote astringent effects are produced by its administration; and hæmorrhages, as menorrhagia, hæmaturia, and hæmoptysis, increased mucous and other discharges,

hectic sweating, diarrhœa, and dysenteric affections, are quickly influenced by its administration.

Gallic acid appears to differ from tannin in its topical action, being less astringent, probably from its comparatively slight solubility; it however becomes absorbed, and the remote effects are identical with those of tannin. Probably as a remote astringent it is more powerful than an equal quantity of tannic acid, for the latter becomes converted in the blood into gallic acid and grape sugar, and hence part only is available. This was the conclusion at which the author arrived from some extensive trials made many years since, in the treatment of various forms of hæmorrhages.

Externally, the decoction of gall-nuts, or solutions of tannic or gallic acid, may be employed to suppress hæmorrhage from the gums, nose, or any part to which they can be applied; or to lessen discharges from mucous membranes, as in gleet, leucorrhœa, &c.

Dose. Of the tincture of galls (seldom used, except as a test), ½ fl. drm. to 1½ fl. drm.; of tannic acid, 3 gr. to 20 gr.; of gallic acid, 3 gr. to 20 gr.; about 4 gr. of gallic acid can be dissolved in 1 fl. oz. of water. Both tannic and gallic acids are soluble to a considerable extent in glycerine.

Incompatibles. Salts of iron, especially the persalts, strike black with both tannic and gallic acids; infusions and decoctions of vegetable substances containing alkaloids; solution of gelatine, and many metallic substances, as salts of lead, &c. are precipitated by tannic acid.

URTICACEÆ.

Ficus. The Fig; the prepared fruit of Ficus Carica; Lin. Syst., Polygamia dicœcia; a native of Asia; imported from Smyrna.

Description. The part usually known as the fruit of the fig, when dry, consists of the fleshy compressed pear-shaped receptacle, soft, tough, brown, and covered with a saccharine efflorescence, containing numerous small hard seeds in the interior, inclosed in a viscid pulp. These are quite shut in, except at the apex, where a small orifice exists. When nearly ripe the fresh figs are dried and exported largely to this country and other parts of Europe.

Prop. & Comp. They contain chiefly saccharine and mucilaginous matters.

Off. Prep. Figs are used in the preparation of Confectio Sennæ.

Therapeutics. Demulcent, nutritive, and laxative; used sometimes as an article of diet for this latter property. Heated and split open, they are sometimes used as a cataplasm.

Dose. Ad libitum.

Mori Succus. Mulberry Juice [Not officinal in U. S. P.]; the juice of the ripe fruit of Morus nigra; Lin. Syst., Monœcia tetandria; native of Persia, cultivated in Britain.

Description. The fruit from which the juice is obtained is of a dark purple colour, and consists of numerous small berries united together, each containing a single seed, attached to a common receptacle; the fleshy covering of the seeds being formed by the sepals. The juice is of a deep red colour.

Prop. & Comp. The juice has a faint odour and a sweet and acidulous taste; the latter property is said to be due to the presence of tartaric acid.

Off. Prep. Syrupus Mori. Syrup of Mulberries. (Mulberry juice, twenty fluid ounces; sugar, two pounds and a half; rectified spirit, two fluid ounces and a half. Dissolve the sugar in the juice, by a gentle heat, and set by for twenty-four hours; then remove the scum, and pour off the clear fluid from any dregs, if present; lastly add the spirit.)

Therapeutics. The juice is refrigerant, and may be used as a drink in febrile diseases. The syrup is also used as a colouring matter.

Dose. Ad libitum.

Cannabis Indica. Indian Hemp; Cannabis Sativa; Lin. Syst., Diœcia pentandria; the flowering tops of the female plant from which the resin has not been removed, dried; cultivated in India.

Description. The tops, with the remains of the flowers, fruits, and small leaves are met with in bundles, about 2 inches long, of a greenish colour, and with a peculiar odour. In commerce Indian hemp is seen in three principal forms. The resinous

exudation of the leaves and flowers is known as the *Churrus;* the plant itself, consisting of the stems, leaves, and flowers, packed together lengthwise in long bundles, *Gunjah;* and lastly, a mixture of the leaves and capsules, without the stem, *Bang.* The *Hashish* of the Arabs is another form of Indian hemp, sometimes occurring in coils.

Prop. & Comp. The *resin* of the Indian hemp, upon which the peculiar properties depend, is soluble in alcohol and ether, but separates from its solutions on the addition of water. The resin mentioned above has received the name *Cannabin*, and has a bitterish taste and peculiar odour; the plant also contains a little volatile oil.

Off. Prep. EXTRACTUM CANNABIS INDICÆ. Extract of Indian hemp. (Prepared by maceration of the hemp in rectified spirit, and subsequent separation of the spirit by distillation and evaporation to a proper consistence.)

TINCTURA CANNABIS INDICÆ. Tincture of Indian hemp. (Extract of Indian hemp, one ounce; rectified spirit, twenty fluid ounces. Prepared by solution of the extract in rectified spirit.

Therapeutics. Indian hemp produces a peculiar kind of intoxication, attended with exhilaration of the spirits and hallucinations, said to be generally of a pleasing kind. These are followed by narcotic effects, sleep and stupor. In its anodyne and soporific action it resembles opium, but its after-effects are considered less unpleasant; it does not produce constipation and loss of appetite.

Indian hemp possesses antispasmodic and anodyne powers, for which it has been chiefly employed in medicine. It has been administered in the different forms of neuralgia, in spasmodic coughs, as pertussis and asthma, also in tetanus, hydrophobia, and other anomalous spasmodic and painful diseases. Sometimes, but very seldom, it has been used to procure sleep. Much further experience of this drug is required before its real action and value can be fully decided upon; it certainly has disappointed the expectations formed of it when it was first introduced into this country; a circumstance, perhaps, in part due to very inferior hemp having been employed. The urine of patients under its influence sometimes acquires a peculiar odour not very unlike that of the Tonquin bean.

Dose. Of the extract, ¼ gr. to 1 gr. or more; of the tincture, 5 min. to 30 min.

Incompatibles.—The tincture, when added to water, becomes turbid, from the precipitation of the resin, and hence it should be rubbed up with mucilage, to suspend it, or have a few drops of an alkaline liquid added, as aromatic spirit of ammonia, in order to keep it in solution.

Lupulus. [Humulus. U. S.] Hop. The dried catkins of the female plant of Humulus Lupulus, the common Hop; Lin. Syst., Diœcia pentandria; cultivated in England, and found in many parts of Europe.

Description. The catkin or strobile of the hop is composed of membranous scales, each of which contains at the base two small seeds, surrounded by a yellow granular powder. The scale is covered with numerous superficial glands; it is thin, semi-transparent, veined, and of a yellowish colour when dry, with a peculiar fragrant odour and bitter taste. *Lupuline* is the name given to the fine resinous powder secreted by the scales, and obtained by rubbing and sifting the strobiles; it occurs as a golden yellow powder, and has the peculiar flavour of the hop: under the microscope it appears to resemble the pollen of plants.

Prop. & Comp. Hops contain a *volatile oil*, and a peculiar bitter principle, soluble in alcohol, slightly so in water, but insoluble in ether, called *Lupulite* or *Humulin;* these constitute the chief active ingredients. The volatile oil when freshly prepared by distillation of the hops, is green, but is made colourless when redistilled; by exposure to the air, it becomes a resinous mass. It contains a hydrocarbon (C_{20} H_{16}) with valerol (C_{12} H_{10} O_2), the latter by the action of caustic potash is converted into valerianic acid, as shown in the following equation, C_{12} H_{10} O_2 + 3 (KO, HO) + 2 HO = 2 (KO, CO_2) + (KO, C_{10} H_9 O_3) + H_6, and thus the hydrocarbon may be separated from the valerol. The volatile oil was formerly thought to contain sulphur; this, however, has been lately disproved. The scales of the hop contain some adherent lupuline, though in a small proportion. Lupuline yields about 11 per cent. of the bitter principle.

Off. Prep. Infusum Lupuli. Infusion of Hop. (Hops, half

an ounce; boiling distilled water, ten fluid ounces.) [INFUSUM HUMULI. U. S. Hops, half a troy ounce; boiling water, a pint.]

TINCTURA LUPULI. Tincture of Hop. (Prepared by maceration and percolation. Hop, two ounces and a half; proof spirit, twenty fluid ounces.) [TINCTURA HUMULI. U. S. Hops, five troy ounces. Two pints of tincture are made by percolation with diluted alcohol.]

EXTRACTUM LUPULI. Extract of Hop. [Not officinal in U. S. P.] (Prepared by maceration of the hop, first in rectified spirit, and afterwards boiling with water, mixing the two products, and evaporating at a temperature not exceeding 140° to a proper consistence.

[Tinctura Lupulinæ. Tincture of Lupulin. U. S. Lupulin, four troy ounces. Two pints of tincture are obtained by percolation with alcohol.]

[Extractum Lupulinæ Fluidum. Fluid Extract of Lupulin. U. S. Thirty-two fluid ounces of tincture obtained by percolating sixteen fluid ounces of lupulin with stronger alcohol are evaporated to sixteen fluid ounces.]

Therapeutics. Hops are tonic and stomachic, diuretic and narcotic. In the form of bitter beer, taken with meals, they form a useful aid to digestion in some cases of atonic dyspepsia. In the form of a pillow, they have been found anodyne and narcotic. The preparations of hop are not much employed, except as adjuncts.

Dose. Of lupulin, 5 gr. to 10 gr.; of the infusion of hops, 1 fl. oz. to 2 fl. oz.; of the extract, 5 gr. to 20 gr.; of the tincture, ½ fl. drm. to 2 fl. drm.

CONIFERÆ OR PINACEÆ.

Terebinthinæ Oleum. OIL OF TURPENTINE. Oil distilled from the Turpentine of Pinus palustris, Pinus tæda, and sometimes Pinus pinaster; Lin. Syst., Monœcia monadelphia; imported from America and France.

Resina. Resin. The residue of the distillation of the turpentines from various species of Pinus and Abies.

Description. American turpentine, as it flows from the trunks of the above-named trees, has the consistence of treacle, altering

much with heat and exposure; of a pale yellow colour; with a peculiar characteristic pungent odour and taste. When distilled the oil of turpentine passes over, the resin remaining in the retort.

Oil of Turpentine, called also Spirits of Turpentine or Camphine, is a limpid colourless fluid, of the same odour and taste as the above.

Resin or *Rosin* is a solid semi-transparent yellowish substance, with but a little odour and taste.

Prop. & Comp. Common turpentine consists of a mixture of the resin dissolved in the volatile oil, and separable by distillation.

The *Oil of Turpentine* (C_{20} H_{16}), sp. gr. 0·864, is inflammable, it mixes with other oils fixed or volatile, is soluble in alcohol and ether, and dissolves many bodies, as fats, resins, &c.; it partly resinifies, partly volatilizes, on exposure, and forms an artificial camphor (C_{20} H_{16} H Cl.) with hydrochloric acid gas.

The *Resin* (HO, C_{40} H_{29} O_3) consists of three isomeric acids, Pimaric, Pinic, and Sylvic, differing in their solubility in alcohol. Pinic acid is soluble in cold alcohol; sylvic in warm alcohol; pimaric requires boiling spirit. By heat Colophonic acid is formed.

Off. Prep. Of Oil of Turpentine. Confectio Terebinthinæ. Confection of Turpentine. [Not officinal in U. S. P.] (Oil of turpentine, one fluid ounce; liquorice root, in powder, one ounce; clarified honey, two ounces.)

Enema Terebinthinæ. Enema of Turpentine. [Not officinal in U. S. P.] Oil of turpentine, one fluid ounce; mucilage of starch, fifteen fluid ounces.)

Linimentum Terebinthinæ. Liniment of Turpentine. (Oil of turpentine, five fluid ounces; ointment of resin, eight ounces). [Resin cerate, twelve troy ounces; oil of turpentine, half a pint. U. S.]

Linimentum Terebinthinæ Aceticum. Liniment of Turpentine and Acetic Acid. [Not officinal in U. S. P.] (Oil of turpentine acetic acid, and liniment of camphor, each a fluid ounce.)

Unguentum Terebinthinæ. Ointment of Turpentine. [Not officinal in U. S. P.] (Oil of turpentine, one fluid ounce, resin in coarse powder, sixty grains; yellow wax and prepared lard, each half an ounce.)

Of the Resin:

Emplastrum Resinæ. Resin Plaster. (Resin, in powder, four ounces; litharge plaster, two pounds; hard soap, in powder, two ounces.) [Resin, in powder, six troy ounces; plaster of lead, thirty-six troy ounces. U. S.]

Unguentum Resinæ. Ointment of Resin. (Resin, in coarse powder, eight ounces; yellow wax, four ounces; simple ointment, sixteen ounces.) [Ceratum Resinæ. U. S. Basilicon Ointment. Resin, ten troy ounces; yellow wax, four troy ounces; lard, sixteen troy ounces.]

Therapeutics. In small doses, oil of turpentine becomes absorbed, and acts as a stimulant, antispasmodic, and astringent; its effects are especially directed to the kidneys, it causes diuresis, with a peculiar violet odour of the urine, from the oil passing through in an altered condition; it also influences the mucous membrane of the genito-urinary organs in a manner similar to copaiba, and in large doses produces strangury; its astringent property upon the capillary vessels is seen in its power of arresting hæmorrhage, and controlling some forms of inflammation.

In large doses, turpentine acts as a purgative, and possesses besides great power in destroying entozoa in the alimentary canal; its purgative operation is often accompanied by nausea and vomiting, and a species of intoxication.

Oil of turpentine is given occasionally as an antispasmodic in hysterical affections, but, for the most part, as an enema; it is also used in passive forms of intestinal and urinary hemorrhage, in purpura, and in some forms of iritis; its most frequent internal use is, however, as an anthelmintic, in cases where tænia or tapeworm and other entozoa are present in the intestines.

Oil of turpentine, when externally applied, produces powerful rubefacient effects, and when the vapour is confined, even vesication: administered as an enema, both the purgative and stimulant effects may result. Externally it is used in the form of liniment over chronically inflamed and painful parts, and sprinkled on hot flannel as a fomentation in tympanitic conditions of the abdomen from peritoneal inflammation.

Resin and *Common Turpentine* are seldom used, except as

external stimulant applications: the former in the form of ointment or plaster; the latter, not now officinal, was until lately employed either alone or in combination with other resins, as elemi, galbanum, &c.

Dose. Of oil of turpentine, as a stimulant, antispasmodic or diuretic, 10 min. to 30 min., as an anthelmintic purgative, 2 fl. drm. to 6 fl. drm.; of resin, 10 gr. to 30 gr.

Terebinthina Canadensis. Canada Balsam. The turpentine obtained in Canada from the stem of Abies Balsamea, or Balm of Gilead Fir, by incision.

Description. A pale oleo-resin, ductile, consistence of thin honey, drying very slowly by exposure in the air into a transparent adhesive varnish. It has a peculiar agreeable odour and bitter taste; mixed with one-sixth of its weight of magnesia it solidifies.

Therapeutics. Canada balsam resembles the turpentine in its action. It is not often given as a medicine, but is chiefly used for mounting objects for the microscope and other optical purposes.

Thus Americanum. Common Frankincense. [Terebinthina. Turpentine. U. S.] The turpentine exuding from the bark (hardened in the air) of Pinus tæda and Pinus palustris, from the Southern States of North America.

Description. A softish, bright yellow, opaque solid, resinous but tough, with the odour of American turpentine. *True Frankincense*, the natural exudation from Abies excelsa, is not at present imported into this country.

Prop. & Comp. Chemically American frankincense is not known to differ from common resin; it may, however, contain more or less volatile oil.

Off. Prep. Contained in EMPLASTRUM PICIS.

Pix Burgundica. Burgundy Pitch. A resinous exudation from the stem of the Abies excelsa. Spruce Fir (Pinus abies), melted and strained; imported from Switzerland.

[PIX CANADENSIS. The prepared concrete juice of Abies canadensis. U. S.]

Description. Hard and brittle, yet gradually taking the form of the vessel in which it is kept; opaque, varying in colour, but generally dull reddish brown; of a peculiar somewhat empyreumatic perfumed odour and aromatic taste. Without bitterness, free from vesicles; gives off no water when it is heated.

Prop. & Comp. Burgundy pitch consists chiefly of resin, but a little volatile oil is present, imparting to it chief of its odour. The resin probably contains the same or similar acids to those found in American frankincense, or common resin obtained from turpentine.

Off. Prep. EMPLASTRUM PICIS. Pitch Plaster. (Burgundy pitch, twenty-six ounces; common frankincense, thirteen ounces; resin, four ounces and a half; yellow wax, four ounces and a half; expressed oil of nutmeg, one ounce; olive oil, two fluid ounces; water, two fluid ounces.)

[EMPLASTRUM PICIS BURGUNDICA. Burgundy pitch, seventy-two troy ounces; yellow wax, six troy ounces. U. S.]

[EMPLASTRUM PICIS CANADENSIS. Hemlock Pitch Plaster. Canada pitch, seventy-two troy ounces; yellow wax, six troy ounces. U. S.]

[EMPLASTRUM PICIS CUM CANTHARIDE. Plaster of pitch with cantharides. Burgundy pitch, forty-eight troy ounces; cerate of cantharides, four troy ounces. U. S.]

Therapeutics. Burgundy pitch acts externally as a slight stimulant to the skin.

Adulteration. A fictitious Burgundy pitch is often sold, made of common resin, coloured, and made opaque with yellow ochre, palm oil, water, &c.

Pix Liquida. Tar. A liquid bitumen prepared from the wood of Pinus sylvestris and other pines by destructive distillation.

Description. *Tar* is a reddish-black, treacle-like liquid, with a peculiar odour; water agitated with it acquires a bale brown colour, sharp empyreumatic taste and acid reaction.

Prop. & Comp. *Tar* is very complex in composition; having a sp. gr. about 1·040, it contains altered resin, or *colophonic* acid and an empyreumatic oil, in which numerous substances, such as *creosote*, *paraffine*, *picamar*, *kapnomor*, *eupione*, &c., have been

discovered. When shaken with water in the proportion of about one part of tar to four parts of water, tar-water is produced, from the solution of the soluble matter of the tar in that fluid.

Pitch is the altered resin, resulting from the distillation of tar.

Therapeutics. Tar is a slight external stimulant, useful in certain chronic skin diseases, as lepra, psoriasis and ichthyosis. The vapour of tar has been found useful in chronic bronchitis, and it has been given internally in the above-mentioned skin diseases, and in phthisis, &c.

Dose. Of the tar, 20 min. to 1 drm., and upwards, made into pills with flour, or given as tar-water in doses of 1 fl. oz. to 4 fl. oz.

[JUNIPERUS. Juniper. The fruit of juniperus communis. U. S.]

Juniperi Oleum. English Oil of Juniper. The oil distilled in England from the unripe fruit of Juniperus communis, or common Juniper; Lin. Syst., Diœcia monadelphia; growing in Northern Europe, &c.

Description. The oil of juniper is colourless or pale yellow, having in a high degree the odour and warm aromatic taste of the fruit.

The fruit or berries are about the size of black currants, of a dark purple colour, with a bloom upon the surface, filled with a brownish-yellow pulp; the odour is agreeable, but slightly terebinthinate.

Prop. & Comp. The oil of juniper (C_{20} H_{16}) has sp. gr. 0·855. Some *resin* from the oxidation of the oil, which quickly becomes altered, sugar, wax, &c., are found in the fruit in addition to the oil.

Off. Prep. SPIRITUS JUNIPERI. Spirit of Juniper. (English oil of juniper, one fluid ounce; rectified spirit, nine fluid ounces.) This spirit contains about ninety-five times as much oil of juniper as spiritus juniperi, *Lond.* [Not officinal in U. S. P.]

[SPIRITUS JUNIPERI COMPOSITUS. Compound Spirits of Juniper. Oil of juniper, one fluid drachm and a half; oil of caraway, oil of fennel, each ten minims; diluted alcohol, eight pints. U. S.]

Therapeutics. Oil of juniper is a powerful stimulant, especially to the kidneys. It is used in medicine chiefly on account of its diuretic action; and has been found valuable in different forms of

dropsies, either given alone, or combined with other diuretics. It is contained in Hollands.

Dose. Of the oil, 2 min. to 10 min.; of the spirit of juniper, 20 min. to 1½ fl. drm.

Oleum Cadinum. Oil of Cade. [Not officinal in U. S. P.] (Huile de Cade.) An oil obtained in Germany and France, from the dry distillation of the wood of Juniperus oxycedrus. It occurs as a slightly thick black liquid, with a tarry odour. It has long been employed in veterinary medicine; and recently introduced as an external remedy in the treatment of chronic cutaneous diseases, as lepra, psoriasis, eczema, favus, &c. in short, in the same affections for which ordinary tar has been found effectual. It may be employed either in the form of an ointment, made with equal parts of the oil and fatty matters, or made into a soap, or diluted with spirit as a lotion. The composition of this oil is probably almost identical with that of common tar oil.

Sabina. Savine. The fresh and dried tops of Juniperus Sabina; Lin. Syst., Dicœcia monadelphia; collected in the spring from plants cultivated in Britain.

Sabinæ Oleum. English Oil of Savin. The oil distilled in England from the fresh tops.

Description. The *fresh tops* consist of the young branches enveloped in minute imbricated appressed leaves, in four rows, of a dark green colour, strong and peculiar disagreeable odour and taste. The tops can be detected when in coarse powder, by means of the microscope, as the woody fibres exhibit the circular pores which characterize the gymnosperms.

The *Oil* is colourless or light yellow, with the odour and taste of the tops.

Prop. & Comp. The tops owe their activity to the *volatile oil*, oleum sabinæ ($C_{20}H_{16}$), sp. gr. 0·915; besides which, a *resin*, gallic acid, and the ordinary ingredients of young tops are present.

Off. Prep. Of Savin Tops. TINCTURA SABINÆ. (Tincture of Savin. [Not officinal in U. S. P.] Savin, dried and bruised, two ounces and a half; proof spirit, one pint. Prepared by maceration and percolation.)

Unguentum Sabinæ. Ointment of Savin. (Fresh savin, bruised, eight ounces; white wax, three ounces; prepared lard, sixteen ounces.) [Ceratum Sabinæ. U. S. Savine, in fine powder, three troy ounces; resin cerate, twelve troy ounces; ether, a sufficient quantity. A percolate is procured by ether, which is evaporated to the consistence of syrup, and then mixed with the cerate, softened by heat.]

Therapeutics. Savine acts as an irritant both internally and externally; it also appears to possess much power as an emmenagogue. It is used externally to keep up the discharge from blistered surfaces; internally in deficient menstruation, unattended with congestion of the pelvic organs. In large doses it causes abortion, and its administration is attended with much danger in pregnancy.

Dose. Of dried tops, 3 gr. upwards; of the oil of savin, 1 min. to 5 min. (suspended); of tincture of savin, 20 min. to 1 fl. drm.

Terebinthina Veneta, Venice Turpentine, is occasionally employed as a remedial agent; it is the liquid resinous exudation of Abies larix, and has the same composition and medicinal properties as the other turpentines. It is often much adulterated.

CLASS II. ENDOGENÆ.

ZINGIBERACEÆ.

Zingiber. Ginger. The rhizome, scraped and dried, of the Zingiber officinale (Amomum Zingiber), Ginger; Lin. Syst., Monandria monogynia; native of Hindostan, but is cultivated in the West Indies as well as in the East.

Description. The rhizome is generally about 3 or four inches in length, knotty, yellowish-white, but not chalky on the surface, with a short mealy fracture; hot taste, and agreeable aroma. Powder yellowish-white. In commerce there are two principal varieties, the white or Jamaica, and the black or East Indian; for the former the best pieces are selected, scraped, scalded, and dried by exposure to the sun; the black variety is dried without being first scraped, hence it is the larger of the two.

Prop. & Comp. Odour spicy and aromatic; taste warm and

pungent. In addition to the ordinary constituents of roots, it contains a *volatile oil* and a *resinous matter*, upon which its pungency seems to depend. The sp. gr. of the oil is 0·893, and its composition may be represented by the formula (4 C_{20} H_{16}, 5 HO). The quantity of starch contained in the root is considerable.

Off. Prep. Tinctura Zingiberis. Tincture of Ginger. (Bruised ginger, two ounces and a half; rectified spirit, one pint. Prepared by maceration and percolation.) [U. S. Two pints of tincture are procured by percolation with alcohol, from eight troy ounces of ginger in fine powder.]

Syrupus Zingiberis. Syrup of Ginger. Tincture of ginger, one fluid ounce; syrup, seven fluid ounces.

Therapeutics. Ginger is an aromatic stimulant and carminative. When taken internally it produces an agreeable feeling of warmth at the epigastrium, and appears to aid digestion by giving a healthy tone to the stomach; hence it is used in atonic forms of dyspepsia, especially if attended with much flatulence, and as an adjunct to various purgative medicines to correct their griping tendency. When chewed it acts as a sialagogue, and is sometimes used in relaxed states of the uvula and tonsils.

Dose. In powder, 10 gr. to 20 gr. and upwards; of tincture, 10 min. to 30 min. and upwards; of the syrup, ½ fl. drm. to 1 fl. drm.

Curcuma. Turmeric. Appendix B. The rhizome of Curcuma longa; Lin. Syst., Monandria monogynia; native of Ceylon.

Description. The best rhizomes are in small short pieces, yellow externally, deep orange within.

Prop. & Comp. Turmeric contains a peculiar colouring principle soluble in alcohol, and when dried, of bright yellow colour; by the action of alkalies this is turned to a deep brown.

Off. Prep. Turmeric Paper. (Unsized paper steeped in tincture of turmeric and dried by exposure to the air.)

Turmeric Tincture. (Turmeric, bruised, one ounce; proof spirit, six fluid ounces.)

Use. Turmeric acts as a stimulant, but is not used as a remedy; it is taken as a condiment in the form of curry powder, of which

it is an ingredient. In the Appendix it is introduced for testing alkalies. When the yellow colouring matter of turmeric is brought in contact with alkaline solutions, it is changed to reddish brown.

Cardamomum. Cardamoms. The seed of Elettaria Cardamomum, the Malabar cardamom; Lin. Syst., Monandria monogynia; native of Malabar.

Description. The seeds are generally met with in their capsules; the capsules are oblong triangular, the angles being somewhat rounded off, wrinkled, and of a light yellow colour, divided into three compartments, each of which contains numerous seeds of a dark colour, and triangular in shape, corrugated, reddish-brown, internally white. The seeds only ought to be used. Cardamoms are distinguished according to their lengths by the respective names of shorts, short-longs, and longs.

Prop. & Comp. The seeds have a fragrant odour, which depends on the presence of a *volatile oil;* the amount yielded being about 4·5 per cent. This is of an aromatic taste, and is said to have a sp. gr. of 0·945; the seeds contain in addition a fixed oil, together with *colouring matter* and salts, &c.

Off. Prep. Tinctura Cardamomi Composita. Compound Tincture of Cardamom. (Cardamoms, bruised, caraway, bruised, each a quarter of an ounce; raisins, freed from their seeds, two ounces; cinnamon bruised, half an ounce; cochineal in powder, sixty grains; proof spirit, twenty ounces. Prepared by maceration and percolation.)

[Cardamom, three hundred and sixty grains; caraway, one hundred and twenty grains; cinnamon, three hundred grains; cochineal, sixty grains; clarified honey, two troy ounces; diluted alcohol, a sufficient quantity. Two pints and six ounces of tincture are obtained by percolating the powders with the diluted alcohol; this is mixed with the clarified honey and filtered. U. S.]

[Tinctura Cardamomi. U. S. Two pints of tincture are procured from four troy ounces of cardamom, in fine powder, by percolation with diluted alcohol.]

Cardamom is also an ingredient of some other preparations, as Pulvis aromaticus. (See Cinnamon.)

Therapeutics. It is an agreeable aromatic stimulant stomachic, and carminative; used in the East as a condiment. Chiefly em-

ployed as an adjunct to purgative and other medicines, to correct any tendency to griping, also as a colouring matter.

Dose. Of the seeds, powdered, 5 gr. to 20 gr.; of the compound tincture, ½ fl. drm. to 2 fl. drm.

MARANTACEÆ.

Maranta. Arrow-root. (Not officinal.) [Officinal in U. S. P.] Fecula of the tuber of Maranta arundinacea (arrow-root); Lin. Syst., Monandria monogynia; native of the West Indies.

Description. A white powder, tasteless and inodorous.

Prop. & Comp. It consists of pure starch. Under the microscope the form of the granules is ovate, oblong, or irregularly convex, with very fine rings, and a circular hilum, often cracked in a stellate or linear manner; their size varies from the 800th to 2000th part of an inch; the greater number are small.

Therapeutics. Demulcent; chiefly employed as an article of diet for invalids.

Dose. Ad libitum.

Adulteration. Potato starch, distinguishable under the microscope by having much larger grains than arrow-root, and by the concentric rings being strongly marked.

IRIDACEÆ.

Crocus. Saffron. The stigma and part of the style, dried, of Crocus sativus; Lin. Syst., Triandria monogynia; native of Greece and Asia Minor; imported from Spain, France, and Naples.

Description. The stigma, and part of the style of the flower, forms a thin filament, broad at one end, and tripartite, of an orange-red colour. Dried carefully, without further preparation, it forms *hay saffron*, and when packed and pressed into parcels, *cake saffron*.

Prop. & Comp. Saffron moistened and pressed upon white paper leaves an orange-coloured stain, and yields to water and alcohol an orange-red *colouring matter*. It also contains a *volatile oil*. When pressed between folds of white filtering paper it leaves no oily stain.

Off. Prep. Tinctura Croci. Tincture of Saffron. [Not officinal in U. S. P.] (Saffron, one ounce ; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.)

Saffron is also an ingredient of aromatic powder.

Therapeutics. Saffron has a very slight stimulant action ; it is rarely given alone, and its chief use in medicinal preparations is as a colouring agent. It is supposed to be useful in the treatment of the exanthemata.

Dose. Of dried saffron, from 20 gr. upwards ; of the tincture, ½ drm. to 2 drm.

SMILACEÆ.

Sarsa. Jamaica Sarsaparilla. The dried root of Smilax officinalis. Sarsaparilla ; Lin. Syst., Diœcia hexandria ; native of Central America, imported from Jamaica.

Description. Sarsaparilla consists of the rhizome or root-stock, called also the chump, with numerous roots attached, generally several feet long, but of different lengths and thickness in different varieties ; these roots often give off secondary rootlets, which are themselves again finely subdivided ; they are then said to be bearded. On a transverse section of the roots they are seen to consist of a cortex or rind, and a ligneous cord, or meditullium inclosing the pith. According to the characters of these layers the Sarsaparillas of commerce have been classified by Dr. Pereira into the *non-mealy* and *mealy* varieties.

In the *non-mealy* varieties the cortex is deeply coloured and not mealy. Although some starch granules can be detected under the microscope, still the number is comparatively few. The diameter of the meditullium is generally four or five times greater than that of the cortex. Oil of vitriol applied to a transverse section causes both cortex and wood to become of a dark red tint, and iodine shows but a small amount of starch. Under this division are included the *Jamaica*, the *Lima*, and the *true* or *lean Vera Cruz*.

The *Jamaica*, the only officinal Sarsaparilla, occurs in bundles, from a foot to a foot and a half in length, with spirally twisted roots, not thicker than a goose quill, several feet in length,

folded, with numerous rootlets (*bearded*) of a reddish-brown colour. Jamaica Sarsaparilla has a mucilaginous and slightly bitter and acrid taste; it is not mealy, but yields much extractive matter when heated with water.

Lima Sarsaparilla occurs in bundles, about two or three feet long, folded with the chump in the interior, of a greyish-brown colour; it is derived from Smilax officinalis.

The *true Vera Cruz* is not often found in commerce; it is lean, unfolded, with few rootlets; the chump is present.

The *mealy* varieties are distinguished by the large amount of starch contained in the inner cortical layers, which are sometimes equal in thickness to the meditullium; they break with a starchy fracture: the cortex is often cracked transversely, and sometimes falls off; they have occasionally a swollen appearance, and are then named gouty. If a drop of sulphuric acid be added to a transverse section, the mealy coat is unchanged, the ligneous zone becomes dark purple, and when a solution of iodine is applied, the starchy layer becomes evident, from the formation of the blue iodide of starch.

The mealy varieties include the *Honduras*, the *Brazilian*, and the *Caraccas*, or gouty Vera Cruz.

The *Honduras* occurs in bundles, about three feet long, composed of the folded roots, secured by a few circular twists; of a dirty brown colour, with many lateral fibers, but no chump; it is very mealy. It is brought from the Bay of Honduras. The botanical origin is doubtful.

The *Brazilian* or *Lisbon* occurs in bundles, from three to five feet long, composed of the unfolded roots, bound together very tightly by a flexible stem; of a reddish brown colour, with few rootlets. It comes from the Brazils, through Lisbon. It is probably derived from Smilax papyracca, and Smilax officinalis.

Caraccas, or *Gouty Vera Cruz*. In bundles, two feet and a half long, and one foot broad, of a pale yellow colour. The chump is present, and is very mealy. Derived from Smilax officinalis and syphilitica.

Prop. & Comp. Sarsaparilla contains a volatile oil, starch, ligneous fibre, and a peculiar principle occurring as a white

powder, *Smilacin*, of which little is known; soluble in hot water and alcohol, but almost insoluble in cold water; it colours sulphuric acid red.

Off. Prep. Decoctum Sarsæ. Decoction of Sarsaparilla. [Not officinal in U. S. P.] (Jamaica sarsaparilla, not split, two ounces and a half; boiling distilled water, thirty fluid ounces. Reduce to a pint.)

Decoctum Sarsæ [Sarsaparillæ. U. S.] Compositum. Compound Decoction of Sarsaparilla. (Jamaica sarsaparilla, not split, two ounces and a half; sassafras, in chips; guaiac wood turnings; fresh liquorice root, bruised—of each a quarter of an ounce; mezereon, sixty grains. Boiling distilled water, thirty fluid ounces. Reduce to a pint.)

Extractum Sarsæ Liquidum. Liquid Extract of Sarsaparilla. (Jamaica sarsaparilla, not split, one pound; distilled water, at 160°, fourteen pints; rectified spirit, one fluid ounce. Prepared by macerating and digesting the sarsaparilla in the water, and evaporating by a water bath to one-half, or until the specific gravity of the liquid is 1·13; the spirit is added when the liquid is cold. The specific gravity should be about 1·095.) [Sarsaparilla, sliced and bruised, six troy ounces; bark of sassafras root, sliced, guaiacum wood, rasped, liquorice root, bruised, each, a troy ounce; mezereon, sliced, one hundred and eighty grains. Macerate with four pints of water for twelve hours, then boil for a quarter of an hour and strain, adding sufficient through the strainer to make the decoction measure four pints. U. S.]

[Extractum Sarsaparillæ Fluidum. Fluid Extract of Sarsaparilla. Sarsaparilla, in moderately fine powder, sixteen troy ounces; sugar, in coarse powder, ten troy ounces; diluted alcohol in sufficient quantity. Four pints of tincture are obtained by percolation with diluted alcohol; this is evaporated to a pint. U. S.]

[Extractum Sarsaparillæ Fluidum Compositum. Compound Fluid Extract of Sarsaparilla. U. S. Sarsaparilla, in powder, sixteen troy ounces; sugar, in coarse powder, ten troy ounces. Four pints of tincture are obtained by percolating the powder with diluted alcohol. This is evaporated to a pint; the sugar is

then added, and the evaporation continued until the fluid again measures a pint.]

Therapeutics. Very little that is definite can be stated with regard to the action of sarsaparilla upon the animal economy; it is supposed to be diaphoretic, diuretic, tonic, and alterative. It is extensively employed in the treatment of secondary syphilis, but as it has been generally administered in combination with powerful remedies, it is difficult to ascertain how much influence this drug has had in the cure of the affection. By some practitioners sarsaparilla is regarded as a remedy of great value; by others as possessing but little power: as a rule it is more relied on by surgeons than physicians. Sarsaparilla has also been given in cachectic conditions of the habit depending upon other causes, as in scrofula, &c.; and in the form of the compound decoction, in which other stimulant sudorific agents are present, it is employed in the chronic forms of rheumatism, gout, and skin diseases.

Dose. Of either decoction, 1½ fl. oz. to 4 fl. oz.; of the liquid extract, ½ fl. drm. to 2 fl. drm.

Adulteration. Inferior kinds of sarsaparilla are substituted for the officinal Jamaica variety; these yield much less extractive matter; sometimes other substances are mixed with it, as dulcamara, &c., detected by the difference of structure.

PALMÆ.

Sago. Sago. (Not officinal.) The fecula of the stem of Sagus lævis, and other species of palm; Lin. Syst., Monœcia hexandria: native of the East Indies.

Description. Sago of the shops is of two kinds; the first variety, in very fine grains, is known as pearl sago; in the second, or common sago, the grains are much larger and coarser.

Prop. & Comp. It consists principally of *starch.* Under the miscroscope the granules are found smaller than those of potato starch, the hilum is circular, breaking with a single slit, or in a stellate manner, and the circular rugæ are much less marked.

Therapeutics. It is easily digested, and nutritive; chiefly used as an amylaceous diet for convalescents.

LILIACEÆ.

Scilla. Squill. The bulb, sliced and dried, of Urginea Scilla (Scilla maritima); Lin. Syst., Hexandria monogynia; growing on the southern coasts of Europe bordering on the Mediterranean.

Description. The recent bulb is pear-shaped, varying in size from a man's fist upwards, and weighing from half a pound to four pounds. It is made of a series of scales overlapping one another; the outer ones are thin and membranous, brownish red or white; the internal thicker, fleshy, white, and juicy. As met with in the shops, it is generally in small, thin transparent pieces, of a white or slight yellow colour, consisting of transverse sections of the bulb.

Prop. & Comp. Squill has a disagreeably bitter taste; the pieces are brittle and easily pulverable if very dry, but if exposed readily recovering moisture and flexibility. Squill yields its active constituents to water, acetic acid, and alcohol. From the most recent analysis, it appears to contain an *acrid resin*, having very powerful medicinal properties; also a very *bitter principle*, *Scillitine*, together with sugar, mucilage, and citrate of lime, which is found in the form of acicular crystals in the parenchyma of the bulb.

Off. Prep. Pilula Scillæ Composita. Compound Squill Pill. (Squill in fine powder, one ounce and a quarter; ginger, ammoniac, hard soap, each one ounce; treacle by weight, two ounces, or a sufficiency.) [Squill, sixty grains; ginger, ammoniac, each one hundred and twenty grains, all in fine powder; soap, one hundred and eighty grains. The powders are mixed, and then beaten with syrup to form a mass, to be divided into one hundred and twenty pills. U. S.]

Syrupus Scillæ. Syrup of Squill. (Squill, bruised, two ounces and a half; dilute acetic acid, twenty fluid ounces; refined sugar, two pounds; proof spirit, one fluid ounce and a half.) The squill is first digested in the acetic acid, the spirit added, and then the solution filtered, and the sugar dissolved in with the aid of heat. The product should weigh three pounds two ounces, and should have the specific gravity 1·330. [Vinegar of squill, a

pint; sugar, twenty-four troy ounces. Dissolve the sugar with the aid of heat and strain while hot. U. S.]

[Acetum Scillæ. Vinegar of Squill. U. S. Four troy ounces of powdered squill are percolated with dilute acetic acid so as to obtain two pints of filtered liquor.]

[Syrupus Scillæ Compositus. Compound Syrup of Squill. U. S. Squill, seneka, each four troy ounces; tartrate of antimony and potassa, forty-eight grains; sugar, forty-two troy ounces. Three pints of tincture are obtained from the mixed seneka and squill by maceration and percolation; to this, reduced by boiling and evaporation to a pint, six fluid ounces of boiling water. The sugar is dissolved in the filtered fluid, and the solution heated and strained. The tartrate of antimony and potassa is dissolved in the hot solution, and sufficient boiling water added through the strainer to make it measure three pints.]

Tinctura Scillæ. Tincture of Squill. (Squill, bruised, two ounces and a half, proof spirit, one pint. Prepared by maceration and percolation.)

Therapeutics. Squill acts as a stimulant expectorant and diuretic, and in larger doses produces vomiting and purging. It increases the secretions of the bronchial mucous membrane, and also aids the expectoration of mucus, when abundant and viscid. Its stimulating and acrid properties render it inadmissible in cases of an active inflammatory nature. As a diuretic, it is generally given in combination with a mercurial. It is seldom given as an emetic, as it produces distressing nausea, and sometimes hypercatharsis. As an expectorant, ipecacuanha and ammoniacum are frequently conjoined with it.

Dose. Of the powdered squills, 1 gr. to 2 gr. or more; of pilula scillæ comp., 5 gr. to 10 gr.; of syrupus scillæ (a substitute for oxymel scillæ), ½ fl. drm. to 1½ fl. drm.; of tinctura scillæ, 10 min. to 20 min.

Aloe Barbadensis. Barbadoes Aloes. Inspissated juice of the cut leaf of Aloe vulgaris, the common aloe, growing in the East and West Indies; imported from Barbadoes.

Aloe Socotrina. Socotrine Aloes. The juice of the cut leaf of uncertain species of aloes, hardened in the air; usually procured

from Socotra. [The inspissated juice of the leaves of Aloe Socotrina. U. S.]

[Aloe Capensis. Cape Aloes. The inspissated juice of the leaves of Aloe Spicata, and of other species of aloes. U. S.]

Description. *Barbadoes* aloes is usually seen in the gourds in which it is collected and dried; it has a dull appearance, and occurs in yellowish-brown masses, very opaque even in thin layers, with an odour which is extremely nauseous, especially when breathed upon; the taste is intensely bitter; it breaks with a dull conchoidal fracture; when powdered, it has a dull olive-green colour; it dissolves almost entirely in proof spirit, and during solution exhibits under the microscope numerous crystals; it is the produce of *Aloe vulgaris*, and probably of other species also.

Socotrine Aloes has a bright garnet-red colour; breaks with a vitreous fracture, and possesses considerable transparency; the odour is fruity, and by no means disagreeable, the taste very bitter; the colour of the powder is bright orange-yellow, it dissolves entirely in proof spirit, and during solution exhibits under the microscope numerous minute crystals. The author has found that some specimens of transparent Socotrine aloes fail to show crystals under the microscope; the cause of this is easily seen from what is stated below concerning the aloe juice.

Within the last few years, a large sample of liquid aloes has been imported from the coasts of the Red Sea, stated to be the produce of the plant yielding true *Socotrine* aloes; this liquid, which has the consistence of treacle, is at first nearly opaque, but gives rise to a deposit; the upper portion then becomes transparent, and the opaque sediment, under the microscope, is found to consist of myriads of prismatic crystals. When liquid aloes is dried at a very low temperature, as in the sun, an opaque mass, crystalline in structure, and not unlike Hepatic aloes, is produced; when, however, heat is employed, the crystals are dissolved, and a transparent variety, similar to very transparent Socotrine aloes, results. Semi-opaque Socotrine, Hepatic, and Barbadoes aloes will also, if heated in thin layers, lose their crystalline structure, and become transparent.

Hepatic Aloes (not now officinal), called also *East Indian Aloes*, has a dark reddish-brown or liver colour; opaque or translucent;

usually more or less brittle; possesses an odour not disagreeable; taste very bitter; the colour of the powder is yellow; microscopically examined, numerous small crystals are usually observed.

A fourth variety, called *Cape Aloes*, the produce of Aloe spicata and other species, is often met with in masses which break with a conchoidal fracture, of a greenish-brown colour, and having some translucency; the powder is of a greenish-yellow tint, and does not exhibit any crystalline appearance under the microscope; the odour is often strong, but not nauseous like Barbadoes aloes.

An inferior kind of Cape aloes has been named Caballine aloes.

Prop. & Comp. A principle named *Aloine* has been obtained from nearly all the varieties of aloes, it crystallizes in needles, and has the formula $C_{34}\ H_{18}\ O_{14}$; it is probably the same as the crystalline matter contained in the semi-fluid form of aloes, and in the Barbadoes and Hepatic varieties; in addition to this principle aloes contain a substance which has been named *resin*, differing however from ordinary resins in being soluble in boiling water; it is probably formed from aloine by the action of the air: when aloes are acted upon by nitric acid several crystalline compounds are obtained, as *Polychromic*, *Chrysammic* and *Chrysolepic* acids, the solutions of which are strongly red and purple coloured. A peculiar acid, named *Aloetic acid*, is also found in aloes, which strikes olive-brown with the persalts of iron.

Off. Prep. Of Barbadoes or Socotrine Aloes. Enema Aloes. Enema of Aloes. [Not officinal in U. S. P.] (Aloes, forty grains; carbonate of potash, fifteen grains; mucilage of starch, ten fluid ounces.)

Of Barbadoes Aloes.

Extractum Aloes Barbadensis. Extract of Barbadoes Aloes. [Not officinal in U. S. P.] (Barbadoes aloes, in small fragments, a pound; boiling distilled water, one gallon. Made by exhausting the aloes with water, and evaporating the solution to a proper consistence.)

Pilula Aloes Barbadensis. Pill of Barbadoes Aloes. [Not officinal in U. S. P.] (Barbadoes aloes, in powder, two ounces; hard soap, in powder, one ounce; oil of caraway, one fluid drachm; confection of roses, one ounce.)

Barbadoes aloes is contained also in Pilula Cambogiæ Composita, Pilula Colocynthidis Composita, and Pilula Colocynthidis et Hyoscyami.

Of Socotrine Aloes.

Decoctum Aloes Compositum. Compound Decoction of Aloes. [Not officinal in U. S. P.] (Extract of socotrine aloes ninety grains; myrrh, bruised, saffron, chopped fine, each sixty grains; carbonate of potash, forty grains; extract of liquorice, half an ounce; compound tincture of cardamoms, four fluid ounces; distilled water, a sufficiency to form sixteen fluid ounces of decoction after ten minutes' boiling.)

Extractum Aloes Socotrinæ. Extract of Socotrine Aloes. [Not officinal in U. S. P.] The same proportions as in the extract of Barbadoes aloes.

Pilula Aloes Socotrinæ. Pill of Socotrine Aloes. (Socotrine aloes, in powder, two ounces; hard soap, in powder, one ounce; volatile oil of nutmeg, one fluid drachm; confection of roses, one ounce.) [Pilulæ Aloes. Pills of Aloes. U. S. Socotrine aloes, soap, each in fine powder, a troy ounce. Beat with water, into a mass, to be divided into two hundred and forty pills.]

Pilula Aloes et Assafœtidæ. Pill of Aloes and Assafœtida. (Socotrine aloes, in powder, assafœtida, hard soap, in powder, and confection of roses, of each, one ounce.) [Socotrine aloes, assafœtida, soap, in fine powder, each, half a troy ounce. Beat them with water to form a mass, to be divided into one hundred and eighty pills. U. S.]

Pilula Aloes et Myrrhæ. Pill of Aloes and Myrrh. (Socotrine aloes, two ounces; myrrh, one ounce; saffron, dried, half an ounce; confection of roses, two ounces and a half.) [Socotrine aloes, two troy ounces; myrrh, a troy ounce; saffron, half a troy ounce. Beat the whole with syrup, so as to form a pilular mass to be divided in four hundred and eighty pills. U. S.]

[Pilulæ Aloes et Mastiches. U. S. Pills of Aloes, and Mastic. Socotrine aloes, a troy ounce and a half; mastic, red rose, each, half a troy ounce. Beat with water to form a pilular mass, to be divided into four hundred pills.]

Tinctura Aloes. Tincture of Aloes. (Socotrine aloes, in

coarse powder, half an ounce; extract of liquorice, one ounce and a half; proof spirit, twenty fluid ounces.)

[TINCTURA ALOES ET MYRRHÆ. Tincture of Aloes and Myrrh. Socotrine aloes, myrrh, each, three troy ounces; saffron, a troy ounce. Two pints of tincture are obtained by percolation. U. S.]

VINUM ALOES. Wine of Aloes. (Socotrine aloes, one ounce and a half; cardamoms, ground, eighty grains; ginger, in coarse powder, eighty grains; sherry, two pints. By maceration.) [Socotrine aloes, a troy ounce; cardamom, ginger, each, sixty grains; sherry wine, a pint. By maceration. U. S.]

Socotrine aloes are also contained in Extractum Colocynthidis Co., Pilula Rhei Co., and Tinctura Benzoini Composita.

Therapeutics. Aloes, when taken internally, acts as a purgative, affecting chiefly the lower portion of the intestinal canal, sometimes causing hæmorrhoids. The secretions of the tube are but little augmented, and the action is slow in character; by some observers the bile is asserted to be increased in quantity, and the drug appears to influence the whole portal circulation. Emmenagogue effects also are frequently produced. Upon the upper part of the canal, tonic and stomachic effects seem to be induced when small doses are administered

Aloetic preparations are given in cases of habitual constipation, and are of great value from the little disposition they possess to produce a subsequent confined state of the bowels.

In chronic dyspepsia they frequently form a portion of the habitual pill, and may be combined with tonics and stomachics. They are often used as adjuncts to other purgatives, as colocynth rhubarb, scammony, &c., when full cathartic effects are desired, and when there is a defective secretion of bile.

Combined with iron and myrrh, aloes are frequently given in amenorrhœa, connected with defective action of the pelvic organs, and an anæmic condition of the blood.

Aloes should be avoided in cases where there is much tendency to hæmorrhoids, or when inflammatory action is present in the abdominal organs.

There appears to be but little difference of action between the officinal species of aloes. Cape aloes, however, which is not unfrequently employed, is less active than the others.

Dose. Of either barbadoes or socotrine aloes, in powder, 2 gr. to 6 gr.; of the extracts of aloes, 2 gr. to 6 gr.; of the compound decoction of aloes, 1 fl. oz. to 2 fl. oz.; of the barbadoes or socotrine aloes pill, 4 gr. to 15 gr.; of aloes and assafœtida pill, 5 gr. to 15 gr.; of aloes and myrrh pill, 5 gr. to 15 gr.; of the tincture of aloes, 1 fl. drm. to 3 fl. drm.; of the wine of aloes, 1 fl. drm. to 2 fl. drm.

Smaller doses may be given as adjuncts to other purgatives, or when the drug is given in combination with stomachics. The watery extracts are considered to be milder preparations than the aloes from which they are prepared.

MELANTHACEÆ.

Veratrum. [Veratrum Album. U. S.] White Hellebore. The rhizome of Veratrum album; Lin. Syst., Polygamia monœcia; growing in the Pyrenees and Alps. (Not officinal.)

Description. The rhizome is met with in conical truncated pieces, about two or three inches long, and about one inch in diameter, with numerous radicles proceeding from it; yellowish-brown and wrinkled on the outside, light-coloured within, with little odour when dry, but an acrid bitter taste.

Prop. & Comp. White Hellebore contains the alkaloid, *veratria*, united with an acid formerly considered to be gallic acid, probably *veratric*.

Prep. Vinum Veratri, *Lond.* 1851. Wine of White Hellebore. (White hellebore, sliced, eight ounces; sherry wine, two pints. Macerate for seven days, and strain.)

Therapeutics. Veratrum acts as a powerful emetic and drastic purgative, causing much thirst and irritation of the alimentary canal; when applied to the mucous membranes of the nose, intense sneezing results; and on the skin it also acts as a topical irritant. It is not much employed as a remedy at the present time, but was formerly given in cerebral affections, as mania, epilepsy, &c. It has been proposed as a remedy in gout, in lieu of colchicum, but from the author's experience of its effects, he is sure that its action differs completely from that of colchicum; it appears to produce a burning sensation of the œsophagus, parched mouth, and intense thirst, accompanied by great depression, without any alleviation

of the gouty symptoms. Externally veratrum is used in scabies, and occasionally in obstinate skin affections, in the form of the Compound Sulphur Ointment of the London Pharmacopœia, 1851.

Dose. Of vinum veratri, 10 min. to 20 min.

Veratrum Viride. The rhizome of Veratrum viride; American or Green Hellebore; called also Swamp Hellebore and Indian Poke; growing in the marshes and swampy districts of North America. (Not officinal.) [Officinal in U. S. P.]

Description. The rhizome is thick and fleshy, and sends off numerous pale yellow radicles; it resembles closely, in appearance and sensible properties, Veratrum album; it has a peculiar acrid taste, and produces the same sensation of tingling about the fauces as the white hellebore.

Prop. & Comp. The rhizome has been as yet but imperfectly examined; it is, however, stated to contain *veratria;* at any rate, the alkaloid obtained from it causes the intense local irritation and sneezing produced by that principle; in its chemical reaction also, it appears to resemble the active principle from the sabadilla seeds.

[Tinctura Veratri Viridis. Tincture of American Hellebore. U S.]

Prep. A tincture has been made with eight ounces of the dried root to sixteen fluid ounces of the spirit; also an extract from the fresh juice.

[Extractum Veratri Viridis Fluidum. Fluid extract of American Hellebore. U. S. Three pints of tincture obtained by percolation from sixteen ounces of American Hellebore, are evaporated to sixteen fluid ounces.]

Therapeutics. Veratrum viride appears to act upon the system in a manner very analogous to Veratrum album, causing the topical irritation, as shown by the dryness of the fauces and vomiting; and after absorption, it produces extreme depression of the heart, arterial and nervous systems; it has been stated to differ from white hellebore in not causing purging, but cases are on record of poisoning with white hellebore without the occurrence of this symptom. Possibly the production of purging may depend on the form in which it is given, whether in substance or solution. Veratrum viride is asserted to be a valuable agent in controlling the

vascular system in cases of inflammatory disease, and especially in rheumatic fever, gout, and allied affections. The depression and slowness of the pulse appear to be characteristic symptoms of its action.

Dose. Of the powdered rhizome, 1 gr. to 3 gr. or more; of the tincture, 5 min. to 15 min. or more; of the extract (made from the fresh juice) $\frac{1}{4}$ gr. to $\frac{3}{4}$ gr. or more. [Of the fluid extract, 3 to 8 minims.]

This drug should be used with caution, and any symptom of depression carefully watched for.

Sabadilla. Cevadilla. The dried fruits of Asagræa officinalis; Lin. Syst., Hexandria trigynia; imported from Vera Cruz and Mexico.

Veratria. An alkaloid obtained from Cevadilla; not quite pure.

Description. The *fruit* is about $\frac{1}{2}$ an inch long, consisting of 3 light brown papyraceous follicles, each containing from 1 to 3 seeds, which are about $\frac{1}{4}$ of an inch long, blackish-brown, shining, slightly winged, with an intensely bitter acrid taste. *Veratria* occurs in the form of a white or dirty-white powder.

Prop. & Comp. The cevadilla fruit owes its virtues to the alkaloid veratria, which is almost insoluble in water, sparingly soluble in ether, but freely soluble in alcohol, and readily so in dilute acids, leaving traces of an insoluble brown resinoid matter. It has no odour, but a strongly and persistently bitter and highly acrid taste. Veratria is crystalline, and can be obtained in long needles from an alcoholic solution; though the veratria used in medicine is always in an amorphous state. The formula of the pure alkaloid is (C_{64} H_{52} N_2 O_{16}). It causes violent sneezing when applied to the nostrils. Brought into contact with strong sulphuric acid it assumes an intense red colour, and with nitric acid forms a yellow solution. The veratria of commerce is said to contain another principle, *sabadillina*, insoluble in ether, in which it differs from veratria; it does not excite sneezing. Gallic acid appears to be united with veratria in the cevadilla fruit.

Off. Prep.—Of Veratria. Unguentum Veratriæ. Ointment of Veratria. (Veratria, eight grains; prepared lard, one ounce; olive oil, half a fluid drachm.) [Veratria, twenty grains; lard, a troy ounce. U. S.]

Veratria. The alkaloid is ordered to be made by macerating cevadilla with boiling distilled water, then drying and separating the seeds, which are ground in a coffee-mill, and thoroughly exhausted with rectified spirit. The alcoholic solution is concentrated so long as no deposit forms, and then poured, when hot, into twelve times its bulk of cold distilled water. The precipitate thus formed is removed by filtration, and washed; and to the filtered liquid ammonia is added in slight excess, the precipitate allowed completely to subside, then collected on a filter and washed; while still moist, it is diffused through distilled water, and sufficient hydrochloric acid is added to make the fluid acid. It is then digested with animal charcoal, filtered, re-precipitated with ammonia, the precipitate washed on a filter till the washings cease to be affected by a solution of nitrate of silver acidulated with nitric acid, and finally dried by imbibition and on a steam bath.

Therapeutics. As veratrum, but much more powerful; sometimes it is used as a topical irritant in lieu of aconite; it has a less benumbing effect.

Dose. $\frac{1}{12}$ gr. to $\frac{1}{6}$ gr. It should be exhibited with great care if used internally.

Colchici Cormus. [Radix. U. S.] Colchicum Corm. The recent and dried Corm of the wild herb Colchicum autumnale; Lin. Syst., Hexandria trigynia; indigenous.

Colchici Semen. The Seeds, fully ripe, of the Colchicum autumnale.

The Pharmacopœia directs that the corm should be dug up about the end of June, or before the autumnal bud is developed; and for the drying, it directs that the dry tunics being first removed, the corm should be cut transversely into thin slices, and dried at first with a gentle heat, gradually increasing to a temperature not exceeding 150° Fah.

Description. The *corm* is about the size of a chestnut, and of a somewhat similar shape, being convex on one side, and flattened or slightly concave on the other, where it has an undeveloped bud. When recent, it is solid and fleshy with an external brown membranous coat, internally white, and yielding a milky juice on section. There is often a small lateral projection from its base.

When dried and deprived of its outer coat, it is of an ash-grey colour; it is generally met with in transverse slices forming a somewhat oval plane, about a line thick, firm, flat, whitish, and amylaceous; one border convex, the other concave or slightly hollowed out. The taste is bitter and acrid. The *seeds* are spherical, externally of a reddish-brown colour, white within, rather more than a line in diameter, and about the size of black mustard seed.

Prop. & Comp. The corm, and also the seeds, contain fatty matters, gum, starch, lignin, with a peculiar acid—the *Cevadic* acid—and a crystalline principle, *Colchicine*, more soluble in water than veratria, soluble also in alcohol; it has very seldom been isolated.

Off. Prep.—Of the Corm. Extractum Colchici. Extract of Colchicum. [Not officinal in U. S. P.] (The expressed juice, heated to 212°, strained and evaporated at a temperature not exceeding 160°, to the proper consistence.)

Extractum Colchici Aceticum. Acetic Extract of Colchicum. (As the above, with the use of six fluid ounces of acetic acid to seven pounds of corms deprived of their coats.) [Twelve troy ounces of powdered colchicum root, are mixed with four fluid ounces of acetic acid, diluted with a pint of water, the mixture placed in a glass percolator and water poured on gradually until it passes with little or no taste. The filtrate is then evaporated to the consistence of an extract. U. S.]

Vinum Colchici. Wine of Colchicum. [Vinum Colchici Radicis. Wine of Colchicum Root. U. S.] Colchicum corm, dried and sliced, four ounces; sherry, twenty fluid ounces. Prepared by maceration.) [Two pints of wine of colchicum root are obtained by percolating twelve troy ounces of the root in fine powder, by a sufficient quantity of sherry wine.]

[Vinum Colchici Seminis. Wine of Colchicum Seed. U. S. Colchicum seed, in coarse powder, four troy ounces; sherry wine, two pints. Prepared by maceration.]

Of the Seeds. Tinctura Colchici Seminis. Tincture of Colchicum Seed. (Colchicum seed, bruised, two ounces and a half; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.)

Therapeutics. Colchicum in medicinal doses produces increased action of some of the secreting organs; the bile appears to be thrown out in larger quantities, and the fæces become more coloured, and often give evidence of containing the real organic portion of that fluid as well as the colouring matter.

The urine is sometimes increased in quantity, and it is generally asserted that the urea and uric acid are also augmented, but from numerous trials the author is inclined to question the accuracy of the last assertion; at times, also, the action of the skin is increased.

The heart's action is diminished, and in some patients, intermission of the pulse is produced by the drug; in large doses, vomiting and purging, accompanied by intense prostration, ensue.

In gout, when colchicum is administered to patients suffering from inflammation and pain, these symptoms are usually greatly relieved, and to such an extent does this occur, that the drug is regarded as almost a specific in an acute attack of the disease. Colchicum is employed very extensively in the different forms of gout; sometimes given in small doses short of inducing purging, at other times to act freely on the bowels; it certainly possesses a power of controlling the pain and inflammation in gout, independent of all evident increase of the secretions; in what way this effect is produced is at present unknown.

In acute rheumatism and other inflammatory affections, colchicum often relieves, probably rather by its controlling power over the heart's action, than by any specific effect of the medicine.

Colchicum may also be very advantageously given, in cases of imperfect action of the liver, as a cholagogue, combined with other purgatives; and it may be often substituted for mercurials. It has occasionally been prescribed in dropsies and skin affections.

Some practitioners prefer the seeds, some the corm, some again the flowers; it appears however most probable, that the same principle gives activity to all parts of the plant, and that any difference is in degree rather than in character.

Dose. Of pulvis cormi colchici, 2 gr. to 8 gr.; of extractum colchici, ½ gr. to 2 gr.; of extractum colchici aceticum, ½ gr. to 2 gr.; of tinctura colchici, 10 min. to ½ fl. drm.; of vinum colchici, 10 min. to ½ fl. drm.

GRAMINACEÆ.

Farina. Wheat Flour. Appendix A. The flour of the seed ground and sifted, of Triticum vulgare; Lin. Syst., Triandria digynia; growing in Europe, and cultivated also over the greater part of the civilised world.

Bread. Bread made with Wheat Flour. Appendix A.

Amylum. Wheat Starch. Starch procured from the seed of Triticum vulgare.

Description. These substances are too well known to need description. Starch occurs in white columnar masses, which become blue with solution of iodine.

Prop. & Comp. Flour consists chiefly of *starch* and *gluten*, together with gum, sugar, mucilage, and water. If kneaded under a stream of water, the starch is washed away, and a tenacious mass left behind, which consists of gluten, constituting from 10 to 12 per cent. of the flour. *Gluten* prepared in the above manner consists of two different substances, one of which is soluble in alcohol, pure gluten, or vegetable fibrine, the other insoluble in that menstruum known as vegetable albumen. *Starch* occurs as a white granular powder, without odour or taste, which under the microscope is found to consist of grains of varying size, having more or less of a circular outline and flattened, the hilum in the centre is surrounded by a series of concentric rings reaching sometimes nearly to the circumference. Each grain is formed of a thin external albuminous coat, containing a substance which is termed amidin or gelatinous starch.

Amidin is the same from whatever source derived, and it is to the different forms of the external coat that the peculiarities of the different granules of starch, when derived from the different sources, are due. Amidin is soluble in hot water, but starch requires boiling for some little time, in order that the contents of the granules may swell and burst the envelope, before a solution can be made. Amidin strikes a fine blue colour on the addition of free iodine, forming a compound (Iodide of Amidin), which is a ready means of detecting its presence; this blue colour is destroyed by a heat of 200° Fah., but returns when the solution

cools. By heating for some time with dilute sulphuric acid, starch is first converted into *dextrine*, and afterwards into *glucose* or grape sugar. Strong nitric acid changes starch into oxalic acid. The composition of amidin or gelatinous starch is represented by the formula (C_{24} H_{20} O_{20}).

Off. Prep.—Of Amylum. Mucilago Amyli. [Not officinal in U. S. P.] Mucilage of starch. (Starch, one hundred and twenty grains; distilled water, ten fluid ounces. Prepared by trituration and boiling.)

Therapeutics. Made into bread, *flour* forms a well-known nutritive article of diet. In medicine it is chiefly used in the form of bread crumbs (mica panis), for giving consistence to pills; it is also employed as an emollient cataplasm. Flour is used as an ingredient of Cataplasma Fermenti. *Starch* is a mild nutritive demulcent; in the form of mucilage, it is used as a vehicle for enemata.

Hordeum. Pearl Barley. The decorticated seeds of Hordeum distichon; Lin. Syst., Triandria digynia; cultivated in Britain.

Description. Chiefly seen in the shops in the form of pearl barley, white, rounded, retaining a trace of the longitudinal furrow. It consists of the seeds decorticated and rounded in a mill.

Prop. & Comp. It contains *gluten*, *starch*, gum, and saccharine matters.

Off. Prep. Decoctum Hordei. Decoction of Barley. (Pearl barley, two ounces; boiling distilled water, thirty fluid ounces. Prepared by washing the barley well in cold water, rejecting the washings; and subsequent decoction.)

Therapeutics. Used in medicine in the form of decoction as a mild nutritive and demulcent drink.

Dose. Ad libitum.

Avena. Oats. (Not officinal.) The decorticated seeds of Avena sativa, the Common Oat; Lin. Syst., Triandria digynia; growing in almost all parts of the world.

Description. The decorticated grains are known as groats; when decorticated and ground to powder, as prepared groats.

First dried in a kiln, and then coarsely ground, they form oatmeal.

Prop. & Comp. Oatmeal contains *starch*, *gluten*, lignin, sugar, and bitter extractive. The amount of starch is considerable, amounting sometimes to 72 per cent.

Therapeutics. A useful demulcent and emollient, much used in the form of a decoction familiarly known as gruel, also as an enema.

Ergota. Ergot. The grain of the Secale cereale, diseased by an imperfect fungus. [The diseased seeds of Secale cereale. U. S.] Secale cornutum, Spurred Rye.

Description. Ergot occurs in grains, varying in length from one-third of an inch to an inch, and in breadth in the same proportion; somewhat triangular in form, curved, obtuse at the ends, furrowed on two sides, of a purple or brown colour, covered more or less by a bloom; moderately brittle; fracture short, exhibiting a white or pinkish interior; odour faint, but in large quantities, strong and peculiar. Ergot has been considered as a fungus growing in the place of the ovary between the glumes, or as a diseased condition of the grain, produced by the mycelium of Cordyceps purpurea. The latter view seems to be the one more generally entertained at present.

The healthy grain of rye consists of the seed-coat, composed of outer and inner layers, and the cells, containing gluten; and next, the cells of albumen, containing starch. In the ergotized grain, the seed-coat and gluten cells are replaced by a layer of dark cells—the large cells of the albumen by the small cells of the ergot, and the starch grains of the albumen cells by drops of oil. The bloom consists of the sporidia of the fungus.

The ergot is liable to be fed on by a species of acarus, which sometimes destroys the whole interior, leaving only the outer shell and its own excrementitial matter.

Prop. & Comp. Ergot contains a large quantity of fixed oil, about 35 per cent.; this was at first thought to be the active principle; subsequent researches have shown, however, that the fixed oil, when obtained by expression, is inactive, and it would seem that the active principle is extracted with the oil, and remains dissolved in it, but the oil itself is not that principle. A

peculiar reddish-brown substance having active properties has been named *Ergotine*, soluble in water, forming a red solution, and having a strong bitter taste. It is stated that ergotine constitutes about 15 per cent. of the ergotized grain. By distillation with potash, propylamin ($C_3 H_9 NH_2$) has been procured from ergot, a substance having the peculiar odour of herring pickle. Ergot yields its peculiar virtues to alcohol and water.

Off. Prep. Extractum Ergotæ Liquidum. Liquid Extract of Ergot. (Ergot, in coarse powder, one pound; ether, twenty fluid ounces; distilled water, seventy fluid ounces; rectified spirit, eight fluid ounces. The product should measure sixteen fluid ounces. Prepared by removing the oily matters by percolating with well-washed ether, digesting the marc in water at 160°, evaporating this liquid, and then adding spirit, and filtering from the coagulum which is formed.) Each fluid part of this extract represents a solid part of the drug.

[Extractum Ergotæ Fluidum. Fluid Extract of Ergot. U. S. Ergot, in fine powder, sixteen troy ounces; acetic, half a fluid ounce. The acid is mixed with three pints of diluted alcohol, and with the mixture twelve ounces of tincture are obtained by percolation. This is set aside, and the ergot is then percolated with the remainder of the mixture, and with diluted alcohol, until three pints more of tincture have been obtained. This last is evaporated to four fluid ounces, and mixed with the reserved tincture.]

Infusum Ergotæ. Infusion of Ergot. [Not officinal in U. S. P.] (Ergot, in coarse powder, one quarter of an ounce; boiling distilled water, ten fluid ounces.)

Tinctura Ergotæ. Tincture of Ergot. [Not officinal in U. S. P.] (Ergot, bruised, five ounces; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.

[Vinum Ergotæ. Wine of Ergot. U. S. Ergot, in powder, four troy ounces. Two pints of wine are obtained by percolation with sherry wine.]

Therapeutics. Ergot exercises a peculiar influence on the muscular coat of the uterus, causing powerful contractions, especially when in a pregnant state; it also acts on the muscular coats of the vessels of that organ, and apparently on those of the general system. When taken for a long period in small quantities, as in

the form of bread made from ergotized grain, it produces a species of gangrene, resembling gangrena senilis, probably due to its causing obstruction of the vessels by diminishing their calibre. In large doses it induces nausea, vomiting, delirium, stupor, and even death. Its action is said to diminish the frequency and fulness of the pulse. It is most frequently employed to cause contraction of the uterus in cases of labour, and the contractions induced by it differ from the natural ones in being continued, instead of alternating with relaxations. In hæmorrhage after delivery it is especially indicated, also in menorrhagia, leucorrhœa, and sometimes in amenorrhœa.

Dose. Of the liquid extract, 20 min. to 1 fl. drm.; of the infusion, 1 fl. oz. to 2 fl. oz.; of the tincture, ½ fl. drm. to 1 fl. drm.; of the powder, 20 gr. to 30 gr. (Infused in boiling water for about 20 minutes, and both infusion and dregs taken.)

Saccharum Album. [Saccharum. U. S.] Refined Sugar. The purified crystalline juice prepared from the stem of Saccharum officinarum; Lin. Syst., Triandria digynia; cultivated in the West Indies and other tropical climates.

Description. White or lump sugar is too familiar as an article of domestic economy to receive detailed description. It occurs in compact crystalline conical loaves, snow white, dry, scentless, and intensely and purely sweet.

Prop. & Comp. The uncrystallizable liquid forming the mother liquor from which the sugar is crystallized is molasses or treacle; the crystalline portion is clarified and refined in a manner the description of which would occupy too much space in a work of the present size. *Cane sugar* has the formula ($C_{12}H_{11}O_{11}$); it is soluble in half its weight of cold, and in a much less quantity of hot water; a very strong and viscid solution is called syrup. Carefully crystallized from a strong solution with the addition of spirit, it forms oblique four-sided prisms, *sugar candy.* Heated to 365° Fah., it melts, forming a viscid liquid, which when suddenly cooled, solidifies into an amorphous transparent substance, called *barley sugar.* It is less soluble in water than grape sugar, and readily converted into that substance by the action of weak acids, or by fermentation.

Off. Prep. Syrupus. Syrup. (Refined sugar, five pounds; distilled water, forty ounces. The specific gravity should be 1·33.)

Therapeutics. Sugar is demulcent; its sweet taste renders it useful to cover the unpleasant flavour of some remedies. Sugar is used in the formation of the syrups of the Pharmacopœia, and in various other preparations.

Dose. Of sugar or syrup, ad libitum.

Adulteration. Sugar is liable to contain some sulphate of lime, and also lead, from its mode of purification; but the proportion of these substances is so minute, as to be innocuous in the amount given medicinally, though not harmless when sugar is daily used in considerable quantities for domestic purposes.

Theriaca. Treacle. [Not officinal in U. S. P.] Sacchari Faex., *Ph. Lond.* 1851. The uncrystallized residue of the refining of sugar.

Prop. & Comp. Treacle occurs as a dark reddish-brown thick fluid; very sweet; sp. gr. 1·40. It consists chiefly of sugar rendered uncrystallizable by heat; it is capable of fermentation with yeast, and then yields rum by distillation. It should be free from a burnt odour and taste.

Therapeutics. Treacle acts as a slight laxative, in doses of a teaspoonful and upwards; it is often given in combination with sulphur.

CLASS III. ACOTYLEDONES.

Sub-Class I. Acrogenæ.

FILICES.

Filix. Fern Root. The dried rhizome of Aspidium Filix-mas; Lin. Syst., Cryptogamia filices; Male Shield Fern; indigenous; it should be collected in summer.

Description. The central part, or caudex, is thick and cylindrical, with numerous leaf-stalks surrounding the axis; the spaces intervening between are covered with silky scales, and numerous radicles descending beneath them. The dried root is of a greenish brown colour externally, yellowish within, with a peculiar though slight odour, and a taste at first sweet, then bitter. The colour of the powder is yellowish-green, with a disagreeable odour and a nauseous, bitter, somewhat astringent taste.

Prop. & Comp. In addition to starch, gum, and salts, the male fern contains a *volatile oil*, *resin*, and a *fixed oil*. The active properties of the rhizome are soluble in ether; the etherial extract referred to below, commonly known as the *oil of male fern*, is of a dark colour, containing the volatile and fixed oil, resin, and colouring matter in solution.

Off. Prep. Extractum Filicis Liquidum. Liquid Extract of Fern Root. [Not officinal in U. S. P.] (Fern root, in coarse powder, two pounds; ether, eighty fluid ounces, or a sufficient quantity to exhaust the root. Prepared by percolation and subsequent evaporation or distillation of the ether.)

Therapeutics. Fern root is used as an anthelmintic, and acts apparently by killing the worms, and thus aiding their expulsion from the intestinal canal. Its use has been attended with much success in cases of tapeworm; it is said to be more useful against the Bothriocephalus latus than against the Tænia solium. It should be given on an empty stomach, and followed after an interval by some mild purgative.

Dose. Of the powder, 60 gr. to 180 gr.; of the liquid extract, 30 min. to 2 fl. drm.

Sub-Class II. Thallogenæ.

LICHENES.

Cetraria. Iceland Moss. Cetraria islandica; Lichen islandicus; Island Lichen or Moss; Liverwort; the entire lichen obtained in large quantities in Iceland, hence its name.

Description. Iceland moss consists of a foliaceous thallus, the lobes irregularly subdivided, crisp, cartilaginous, brownish-white, paler beneath, fringed at the edges; bitter and mucilaginous.

Prop. & Comp. The soluble portion is taken up by boiling water. The decoction, on cooling, thickens, and deposits a gelatinous matter; this, when dried, forms a semi-transparent mass, insoluble in cold water, alcohol, or ether, but soluble in boiling water, and striking blue with iodine; this is named *Lichenin*. Iceland moss contains also a *bitter principle*, soluble in alcohol and ether, and readily in alkaline solutions, but sparingly so in water;

this is crystallizable, and has acid properties; it is called *cetraric acid.*

Off. Prep. Decoctum Cetrariæ. Decoction of Iceland Moss. (Iceland moss, well washed in cold water, one ounce; distilled water, thirty fluid ounces. Reduce to twenty by boiling.)

Therapeutics. Iceland moss, deprived of its bitter principle, is used by the natives of Iceland and Lapland as an article of diet. The decoction is demulcent and slightly tonic. The cetraric acid is said to have been useful in intermittents as a substitute for quinia.

Dose. Of the decoction, 1 fl. oz. to 2 fl. oz.

Lacmus. Litmus. Appendix B. A peculiar blue colouring matter, obtained from Roccella tinctoria, Lecanora tartarea, and other lichenous plants. Litmus is extensively prepared in Holland.

Description. It occurs in small cakes, made up of a granular powder, of a fine blue colour.

Prop. & Comp. It is prepared by macerating the lichen for some time in water, rendered alkaline by lime and potash, and mixed with urine; a species of fermentation occurs: the mass becomes first red and afterwards blue; it is then removed and reduced to the proper consistence by sand, lime, &c.

Off. Prep. Tincture of Litmus. Appendix. (Made by digesting one ounce of powdered litmus in ten fluid ounces of proof spirit.)

Blue Litmus Paper. Appendix. (Made by steeping unsized paper in the tincture of litmus, and drying by exposure to the air.)

Red Litmus Paper. (Made by steeping unsized paper in the tincture previously reddened with a trace of sulphuric acid, and dried in the air.)

Uses.—Blue Litmus Paper is used as a test for acids, as any liquid having an acid reaction turns the colour of the paper from blue to red.

Red Litmus Paper, on the contrary, serves to indicate the presence of any substance having an alkaline reaction, which restores the original blue colour to the paper.

The *Tincture of Litmus*, when diluted with water, may be used as a test for the presence of acids.

ANIMAL KINGDOM.

CLASS, MAMMALIA.

RODENTIA.

Castoreum. Castor. The follicles of the prepuce of the Castor Fiber, Beaver, filled with a peculiar secretion; dried and separated from the somewhat shorter and smaller oil-sacs, which are frequently attached to them; from the Hudson's Bay Territory.

Description. The follicles are in pairs, about 3 inches long, fig-shaped, firm and heavy, brown or grayish-black, and contain a dry resinous highly odorous secretion. The castor of commerce is of two varieties, the Russian and Canadian; the former is the most highly prized. This substance is secreted by a pair of membranous pear-shaped follicles, situated between the anus and external genitals, and united by a common duct to one another. It is a dark-coloured matter, of the consistence of putty, with a peculiar odour. In Russian castor, the sacs are larger, fuller, and have a stronger smell. In the Canadian variety, they are more or less wrinkled externally, and the contents inferior. The consistence of the contents varies with the amount of water present.

Prop. & Comp. Castor contains *volatile oil*, uric, phosphoric and benzoic acids, combined with potash, soda, and lime, also carbonate of ammonia, *salicine*, *carbolic acid*, and a peculiar principle, *castorin*. Its active properties are taken up by ether and alcohol; slightly by water; but they are decomposed by boiling for some time. The contents of the sacs should be in great part soluble in rectified spirit and ether.

Off. Prep. Tinctura Castorei. Tincture of Castor. (Castor, one ounce; rectified spirit, twenty fluid ounces. [Castor, two troy ounces; alcohol, two pints. U. S.] Prepared by maceration.)

Therapeutics. Castor is stimulant, and antispasmodic; hence

it has been used in hysteria and epilepsy, and also to rouse the system in cases of an adynamic type, as in typhoid pneumonia.

Dose. In substance, 5 gr. to 15 gr.; of tincture, ½ fl. drm to 2 fl. drm.

RUMINANTIA.

Moschus. Musk. The inspissated secretion deposited in the follicles of the prepuce of Moschus moschiferus; native of Thibet and other parts of central Asia.

Description. Musk is contained in a sac situated midway between the umbilicus and the prepuce; the sack is oval and hairy, opening externally by a narrow orifice, small and hairy at its anterior part; internally, lined by a smooth membrane, secreting the musk. There are two chief varieties, the Chinese and the Russian. The sacs are about two inches in diameter, hairy on one side, destitute of hairs on the other, with the hairs concentrically arranged around the opening; the Chinese sacs are the smallest, and the colour of the hairs darker than in the Russian variety. From 100 to 200 grains of musk are contained in each sac.

Prop. & Comp. Musk occurs in irregular, reddish-black, rather unctuous grains concreted together, soft to the touch; the odour is very strong, and diffuses itself over a great space; it contains ammonia, stearine, oleine, cholesterine, various salts, and small quantities of animal matter, with a *volatile oil*, thought by some to be in combination with ammonia; the proportion of these substances varies in different specimens; the active ingredients are soluble in alcohol and ether. Potash evolves ammonia, and increases the peculiar odour.

Therapeutics. Musk is stimulant and antispasmodic, resembling castor in its action, and is useful in the same class of cases.

Dose. 5 gr. and upwards.

Adulteration. On account of the high price of this drug, it is very liable to be adulterated; the sac containing the musk is often emptied of its contents, and filled up with a mixture of dried blood, with a greater or less proportion of true musk, and the sac carefully closed again; traces of the opening should be sought for. Sacs are manufactured from the scrotum or skin of the animal,

and filled with a spurious mixture of musk, sand, and dried blood. The form and character of the bag should be noted, to see whether it differs from that described as genuine; the bag, if made from any other portion of the skin, may be recognized by the peculiar arrangement and microscopic character of the hairs; those of the true sac exhibit distinct, regular colour-cells, not found in the hairs of spurious pods.

Sevum Præparatum. [Sevum. U. S.] Prepared suet. The internal fat of the abdomen of Ovis Aries, The Sheep; purified by melting and straining.

Description. Suet is the fat of the sheep chiefly obtained from the region of the kidney. It is prepared by melting at a gentle heat, and straining. Suet is white, soft, smooth, almost scentless, fusible at 103°; it is soluble in ether and boiling alcohol; it consists principally of *stearine* and *oleine*. *Stearine* forms the chief portion of suet; it may be obtained crystallized from an etherial solution, and then appears in small white plates of a shining character; fuses at 143° Fah., and when it solidifies, becomes opaque, and loses its crystalline character; it is soluble in alcohol and boiling ether, but insoluble in cold ether; its formula is (C_{114} H_{110} O_{12}); by saponification it is converted into stearic acid (HO, C_{36} H_{35} O_3), and glycerine (C_6 H_8 O_6); stearine has lately been artificially produced by heating under pressure stearic acid and glycerine. *Oleine* is the more liquid constituent of fat; it forms an oily fluid varying in quantity in the different varieties of fat, and generally holds in solution more or less of the solid constituents, from which it is separated completely with some difficulty. It exists in large quantity in the vegetable oils. The exact composition of oleine is doubtful; it is more soluble in alcohol than either stearine or margarine; by treatment with an alkali it is resolved into oleic acid (HO, C_{36} H_{33} O_3) and glycerine.

Therapeutics. Suet is emollient, and is used in the preparation of certain ointments and plasters, sometimes also as an addition to poultices.

Cornu. The horn of Cervus Elephas. Hartshorn. (Not officinal.)

Cornu Ustum. Burnt Horn. Phosphate of lime, prepared from horn by fire. (Not officinal.)

Description. Hartshorn is met with in the form of fine shavings, of a yellowish colour, without odour. Cornu ustum occurs as a white powder, obtained by the calcination of the horn.

Prop. & Comp. Hartshorn yields about 27 per cent. of *gelatin*, and 75·5 of *phosphate of lime*. By destructive distillation, the shavings yield an impure solution of carbonate of ammonia, formerly known as spirits of hartshorn. Phosphate of lime as prepared from the horn occurs in the form of a whitish powder; it consists of phosphate of lime (3 Ca O, PO_5), but often contains some lime not in the state of phosphate; this phosphate is identical with bone-earth.

Therapeutics. The gelatine flavoured to suit the taste may be used as an article of diet. Cornu ustum has been recommended in rickets and mollitus ossium.

Saccharum Lactis. Sugar of Milk. Crystallized sugar, obtained from the whey of cow's milk by evaporation.

Prep. The milk is coagulated, the curd separated, and after the whey has been evaporated to the crystallizing point, pieces of wood or cord are introduced, upon which the milk sugar crystallizes.

Prop. & Comp. Milk sugar occurs in cylindrical masses, about 2 inches in diameter and several inches in length, having an axis of cord or wood: the masses are composed of crystals, grayish white, translucent and hard; without odour, and with a slightly sweet taste; it is gritty in the mouth from the slight solubility of the sugar in the saliva. Milk sugar consists of a crystalline principle, termed Lactin or Lactose, which has the composition (C_{24} H_{24} O_{24}); or it may be represented by the formula (C_{24} H_{19} O_{19}+5 HO), the water in the compound being capable of replacement by oxide of lead. Lactose can be obtained in 4-sided prisms, terminated by 4-sided pyramids; it is soluble in about 6 times its weight of water, the solution is much less sweet than that of cane sugar; it is not soluble in alcohol or ether. It is not subject to alcoholic fermentation, but milk is so from the prior slow conversion of the lactose into glucose. When milk ferments in contact with chalk, lactic acid is formed.

Therapeutics. It may be employed for the purpose of rubbing up powerful medicinal powders, as white bismuth, calomel,

hydrochlorate of morphia, &c. Its action as a remedy is not readily appreciable. Probably milk sugar might be advantageously employed as a substitute for cane sugar in the diet of infants. Cow's milk diluted with water, with the addition of milk sugar, forms a good substitute for the milk of the human female.

Dose. Ad libitum.

Fel Bovinum Purificatum. Purified Ox Bile. [Not officinal in U. S. P.] The fresh bile of Bos Taurus, The Ox, purified.

Prep. Ox gall is placed in Appendix A., and from it the purified bile is ordered to be made, by mixing the fresh gall with twice its volume of rectified spirit, and after twelve hours, when the sediment has subsided, evaporating the decanted liquid over a water bath until it has acquired the consistence of a vegetable extract. By this process the mucus which is always present in bile is separated by the action of the spirit, and the preparation is thus rendered much less prone to putrefaction.

Prop. & Comp. Purified bile occurs as a yellowish green substance, somewhat firm and adhesive, having a faint and peculiar odour, and a taste at first very sweet, but soon becoming intensely bitter; it is soluble both in water and spirit. Bile, when separated from the mucus of the gall bladder, consists of two distinct portions, the *true biliary substance* and the *colouring* and *fatty* matters. The former, a species of soap, is of a pale yellow colour, and is composed of two salts, glyco-cholate and tauro-cholate of soda. Glyco-cholic acid ($HO, C_{52} H_{42} NO_{11}$), when pure, can be crystallized in white acicular needles, as likewise can some of its salts. Tauro-cholic acid ($HO, C_{52} H_{44} NO_{13} S_2$), the least abundant acid in ox bile, has not yet been obtained in a crystallized state.

The green colouring matter somewhat resembles the chlorophylle of plants. The peculiar fat of bile is cholesterine ($C_{52} H_{44} O_2$) which readily crystallizes and forms the chief constituent of gall stones.

When bile has been purified by the above-mentioned process, its watery solution is not precipitated on the addition of rectified spirit. A grain or two of bile in 1 fl. drm of water, when treated with a drop of fresh syrup, and then a little sulphuric

acid, cautiously added, exhibits a play of colours from red to violet.

Therapeutics. Dried bile appears to act as a slight laxative on the alimentary canal when given in the ordinary medicinal doses; its use is supposed to be indicated in cases attended with deficient excretion of biliary matter, as shown by the pale colour of the alvine evacuations. It has also been said to be useful as a stomachic in some forms of functional dyspepsia, especially in cases where vomiting occurs after food. More clinical knowledge of its efficacy as a remedy is required before its value can be said to be fairly established.

Dose. Of purified bile, 5 gr. to 10 gr., or more, formed into pills, or given in small gelatinous capsules. When the object is to affect the intestines rather than the stomach, the latter mode is preferable.

Pepsina. Pepsin. (Not officinal.) The digestive principle obtained from the mucous membrane of the stomach of the Calf or Pig.

Prep. One process of preparing pepsin is to wash the stomach, scrape off the mucous membrane, and digest it in distilled water; filter and add acetate of lead, which throws down a precipitate of pepsin with the metal. This precipitate is afterwards submitted to the action of sulphuretted hydrogen, which combines with the lead and leaves the pepsin in solution. After acidification with lactic acid, the solution is evaporated until a gummy mass is left, which is then mixed with dry starch. The pepsin from the pig's stomach, first proposed by Dr. Beale, is made by Mr. Bullock without the employment of the lead process.

Description. The pepsin prepared from the calf's stomach and mixed with starch (Boudault), occurs in a grayish-white powder, having an acid and often disagreeable odour. Pepsina porci (Bullock) is somewhat more coloured, free from acid, and with an odour closely resembling baked flour.

Prop. & Comp. Pepsin (independently of contained starch) is soluble in water; the solution is precipitated by salts of lead and mercury, likewise by tannic acid and alcohol. A solution of pepsin in water, when acidulated with lactic, phosphoric, or hydrochloric acids, has the power of causing the solution of fibrin or

albumen when kept at the temperature of the body (100° Fah.); and the amount of fibrin or albumen dissolved by a given weight of the pepsin may be taken as an indication of the value of the medicine. A temperature above 120° Fah. injures or destroys the solvent powers of pepsin.

Pepsin is a protein body, but little else is known as to its composition; it appears to possess what are termed catalytic powers.

Therapeutics. Pepsin has been given largely in cases of dyspepsia, especially of the atonic kind, and is asserted to have proved a very valuable remedy. Its beneficial action is somewhat difficult to explain, seeing that the ordinary doses of the drug are able to cause the solution of so small an amount of nitrogenized matters when out of the body, fifteen grains of Boudault's pepsin dissolving but sixty grains of dried fibrin.

Dose. Of pepsin (Boudault), about 15 gr. to 20 gr., given with a meal; of pepsina porci, 2 gr. to 4 gr.

It is stated that the latter pepsin is five times stronger than the former.

PACHYDERMATA.

Adeps Præparatus. [Adeps. U. S.] Prepared Lard. The prepared internal fat of the abdomen of Sus scrofa, The Hog. Hog's Lard.

Description. Lard is too familiar to need much description. It is a soft, white, fatty substance, melting at about 100°.

Prop. & Comp. Consistence soft, fuses between 80° and 90°; it consists of a large quantity of oleine (60 per cent.), with some margarine and stearine: these substances, with the exception of margarine, have been before described. Margarine ($C_{108}\,H_{104}\,O_{12}$) may be broken up into margaric acid (HO, $C_{94}\,H_{23}\,O_3$) and glycerine ($C_6\,H_8\,O_6$); it is more soluble in cold ether than stearine. Properly prepared lard has no rancic odour, and dissolves entirely in ether. Distilled water in which it has been boiled, when cooled and filtered, gives no precipitate with nitrate of silver, showing the absence of common salt.

Off. Prep. Unguentum Simplex. Simple Ointment. (White wax, two ounces; prepared lard, three ounces; almond oil, three fluid ounces.)

Lard is also used in the preparation of other ointments.

Therapeutics. Lard is emollient, and is sometimes added to poultices to prevent their getting dry and hard.

CETACEÆ.

Cetaceum. Spermaceti. A concretion prepared from the oily matter of the head of Physeter macrocephalus, or Sperm Whale; inhabiting the Pacific and Indian Oceans.

Description. A semi-concrete oily substance, which is contained in numerous cells situated in the large cavity of the upper jaw of the sperm whale. The oily matter, on standing, separates into an oil, and a peculiar substance, capable of crystallization, spermaceti. The oil is poured off, and the spermaceti collected.

Spermaceti occurs in white crystalline cakes, slightly unctuous; it fuses at 112° Fah., and when quite free from oil has been named *Cetin.* It has little odour or taste, can be reduced to powder by the addition of a little rectified spirit; is scarcely unctuous to the touch; should not melt under 100°. It is combustible, soluble in the fixed oils, and in boiling ether or alcohol. By the action of an alkali it is broken up into an acid, the Ethalic or Cetylic, and a substance somewhat analogous to glycerin, called Ethal or Cetylic alcohol ($C_{32}H_{34}O_4$). Ethalic acid is isomeric with palmitic ($C_{32}H_{32}O_4$). Spermaceti or cetin may be regarded as a palmitate or cetylate of the oxide of cetyl ($C_{32}H_{33}O, C_{32}H_{31}O_3 = C_{64}H_{64}O_4$).

Off. Prep. Unguentum Cetacei. Ointment of Spermaceti. (Spermaceti, five ounces; white wax, two ounces; almond oil, twenty fluid ounces, or a sufficiency.)

Therapeutics. Emollient; formerly given internally, but now chiefly used externally as an emollient application.

CLASS, AVES.

Ovi Albumen. White of Egg. Appendix A. The liquid albumen of the egg of Gallus Bankiva (var. domesticus.)

Ovi Vitellus. The yolk of the Egg. (Not now officinal.)

[Ovum. Egg. The egg of Phasianus Gallus. U. S.]

Description. The *albumen*, or white of the egg, is a trans-

parent, viscid, glairy liquid, miscible with water, coagulated by a heat of 160° Fah., and then becoming opaque, and of a milk-white colour, insoluble in water; by careful drying, at a moderate temperature, it may be solidified, retaining its transparency. It is coagulated by ether, in which respect it differs from the albumen of blood; coagulated also by corrosive sublimate.

The yolk of the egg is of a yellow colour, coagulated by heat; it yields a fixed oil by expression. It contains a peculiar albuminous principle, named *vitellin*, olcine, margarine, cholesterine, together with salts of lime, iron, &c., &c.

Prep. Used in making mistura spiritûs vini gallici. Lond. Ph., 1851. (See Spiritus Vini Gallici.)

Therapeutics. The albumen is recommended as an antidote in cases of poisoning by corrosive sublimate and sulphate of copper. The yolk is a mild, nutritious article of diet, and used in the form of mistura spiritûs vini gallici, or egg flip, forms a useful and nutritious mixture, much employed in exhausted conditions of the system, where solid food cannot be taken. It is much used in the formation of emulsions. An astringent application is made by dissolving alum in albumen; the latter is coagulated, and in this form is applied locally.

CLASS, PISCES.

Isinglass. [Ichthyocolla. Isinglass. U. S.] Appendix B. The swimming bladder or sound of various species of Acipenser, prepared and cut into fine shreds.

Description. Isinglass is the dried swimming bladder of the sturgeon, but many fish yield a similar substance.

Prop. & Comp. Isinglass consists of a gelatinous tissue, which, by boiling, yields gelatine, a substance which is soluble in hot water, and forms a jelly on cooling: it is precipitated by tannic, but not by gallic acid. The combination of gelatine with tannin forms the basis of leather, called often tanno-gelatine.

Off. Prep. Solution of Gelatine. [Not officinal in U. S. P.] (Isinglass, in shreds, fifty grains; warm distilled water, one fluid ounce. Mix and digest for half an hour on a water bath, with

repeated shaking, and filter through clean tow, moistened with distilled water.)

Use. The solution of gelatine is introduced into the appendix of the Pharmacopœia for separatiug tannin from gallic acid.

Oleum Morrhuæ. Cod-Liver Oil. The oil extracted from the fresh liver of Gadus Morrhua by a steam heat not exceeding 180°. [The fixed oil obtained from the liver of Gadus Morrhua and other species of Gadus. U. S.]

Description. The liver of the common cod-fish and other species of gadus, frequenting the seas of northern Europe and America, yields the cod-liver oil of commerce.

The most important species of the oil yielding fish, in a medical point of view, have been thus classified :—

Gadus morrhua, or Asellus major, the common Cod-fish ; found in large quantities on the coasts of England, France, Iceland, and Norway, but especially off Newfoundland.

Gadus callarias, or Asellus striatus, the Dorse ; found largely on the Norwegian coast, and principally near the Lofoden Islands.

Gadus molva, or Asellus longus, the Ling ; found also on the coast of Norway, though less abundantly than the above two species. Plentiful near England.

Gadus carbonarius, or Asellus niger, the Coal-fish ; inhabiting the same localities as the last.

Gadus pollachius, or the Pollack ; found in Norway, especially near Tromsoe.

Gadus merlangus, or Asellus albus, the Whiting ; inhabiting the coasts of France. Besides many other species of less importance.

The oil may be extracted from the livers by three different methods :—by exposing them to the sun to undergo a process of fermentation ; by boiling them in water for some time ; or by dividing the livers, and permitting the oil slowly to drain from them.

1. The oil is sometimes obtained by packing the livers in tall vats, furnished with three taps placed at different heights, and then exposed to the sun, to favour the separation of the oil. On opening the upper tap a pale oil is obtained ; from the middle one a light brown oil ; and a darker brown, yet transparent, oil from

the inferior. The remaining mass of livers yields, by pressure and heat, a very dark and thick product, not fit for medicinal use, but employed by curriers, &c.

2. The second method of preparing the oil is by boiling the livers in water, and afterwards separating the oil from the surface, and filtering from any albumen or cellular tissue mixed with it.

3. The following is the method now employed in the preparation of the best English cod-liver oil at Messrs. Bell and Co.'s establishment. The livers are collected daily, so that no trace of decomposition may have occurred, carefully examined, in order to remove all traces of blood and impurity, and to separate any inferior livers; they are then sliced, and exposed to a temperature not exceeding 180° Fah., till all the oil has drained from them. This is filtered; afterwards exposed to a temperature of about 50° Fah., in order to congeal much of the solid fat (margarine), and again filtered and put into bottles well secured from the action of the air.

Three chief varieties of cod-liver oil occur in commerce, distinguished by their colour: the pale is that rendered officinal, prepared in England or elsewhere; besides which there are the light brown and the dark brown oil, from Norway, &c.

The difference in colour in the different oils depends upon the circumstances attending their preparation, as the amount of heat employed, the state of freshness or putridity of the livers, the quantity of decomposed matter present in the oil, and the length of exposure to the atmosphere, &c.

Prop. & Comp. The pale oil is almost colourless when first prepared, with a slight fishy but not disagreeable odour, sp. gr. from ·917 to ·920, with a bland fish-like taste. The composition of the three varieties is essentially the same, but the darker contains more empyreumatic matter, and is much less agreeable to the taste. Cod-liver oil contains *olein*, *margarine*, various *biliary principles*, as the organic acids and colouring matter of bile; also phosphoric and sulphuric acid, with salts of lime, magnesia, and iron; a peculiar substance, *gaduin* ($C_{35}\,O_{23}\,H_9$), very insoluble in ordinary menstrua, but soluble in sulphuric acid, and giving a blood-red colour to the solution; also *iodine* and *bromine*. The olein and margarine of this oil are said by some to differ from

that usually met with, inasmuch as no glycerine can be obtained by their saponification, but they yield instead a peculiar body, called propyline, or *oxide of propyl*. The proportion of iodine is not more than ·05 per cent. When pure cod-liver oil, spread in a thin layer on a plate, has a drop of oil of vitriol added to it, a beautiful lake or crimson colour is produced, rising from the point of contact of the oil and acid, and rapidly spreading over the surface. This is probably due to the action of the acid on the biliary principles present in the oil.

Therapeutics. Cod-liver oil is a remedy which, at the present time, stands in very high estimation, nor does it appear probable that its repute will be ephemeral in character; how it acts is yet undetermined. When taken for a time by patients who have become emaciated from any cause, and whose blood is impoverished, it frequently restores the flesh; and, from Dr. Theophilus Thomson's statements, it appears also to improve the richness of the blood. Under its influence, patients often gain an almost incredible increase of weight, exceeding many times the amount of the oil which has been taken during the period. The oil also seems to possess the power of arresting the progress of certain morbid actions, such as occur in phthisis and scrofula, and in the low form of rheumatic and other inflammations; in fact, many anomalous diseased conditions become ameliorated under its influence. It has been supposed that the iodine and bromine contained in it might produce the beneficial results, but the idea is not tenable, for the effects of these remedies are very different in character; it would seem probable that it acts simply as an *oil*, and that it is superior to other oils on account of its being more readily assimilated. If the statement of Winkler prove correct—namely, that the oleine differs from ordinary oleine in not yielding *glycerine*—this may in part explain its value. It very seldom happens that patients cannot take the remedy, even when ordinary fatty substances disagree with their stomachs; it very rarely purges, except in cases where ulceration of the intestines is present. Cod-liver oil is employed extensively in the treatment of the different stages of phthisis, and various forms of scrofula: in chronic rheumatism and neuralgia; in chronic skin affections, and many other diseases of a low type and accompanied by a cachectic condition of habit. It has been applied externally in some skin affections, and occa-

sionally with the idea of producing by this means its constitutional effects.

Dose. From 1 fl. drm. to ½ fl. oz.; taken on the top of water, milk, orange, wine, ale, or porter. Some patients prefer it at the time of a meal, or immediately after food.

Adulteration. Many oils may be mixed with cod-liver oil. The addition of the liver oil from other fish is not, perhaps, very important in a therapeutic point of view, and would be difficult or impossible to detect, as all give the test with sulphuric acid. When other oils, not of hepatic origin, are present, the sulphuric acid test is valuable, for the impure specimen either does not give the beautiful lake colour, or this becomes immediately mixed with, and obscured by, a dark brown substance, from the charring of the oil: such is the case with whale or seal oil; also with olive and other vegetable oils.

CLASS, INSECTA.

HYMENOPTERA.

Mel. Honey. A saccharine secretion deposited in the honeycomb by the Apis mellifica. British and imported.

Description. It is a viscid fluid of a slight yellow colour; the purest is obtained by allowing the honey to flow from the comb; it has a peculiar heavy odour and very sweet taste.

Prop. & Comp. It consists chiefly of grape sugar, formula ($C_{12}H_{14}O_{14}$). The sp. gr. is 1·34: it has an aromatic odour dependent in part on the flowers from which it is obtained. It is often adulterated with starch, and this adulteration is recognised by making a solution in hot water, and adding iodide of potassium with nitric acid; if no starch be present, no blue colour is produced.

Off. Prep. Mel Depuratum. [Mel Despumatum. U.S.] Clarified Honey. (Prepared by melting the honey in a water bath, and straining while hot, through flannel previously moistened with warm water.)

Oxymel. Oxymel. (Clarified honey, forty ounces; acetic acid, five fluid ounces; distilled water, five fluid ounces.)

Clarified honey is also used in the preparation of Mel Boracis,

Confectio Piperis, Confectio Scammonii, and Confectio Terebinthinæ.

Therapeutics. The action is much the same as sugar, but more laxative; it is generally used as a vehicle for other medicines.

Dose. Of honey, ad libitum; of oxymel, 1 fl. drm. to ½ fl. oz.

Cera Alba. White Wax. Yellow wax bleached by exposure to moisture and light.

Cera Flava. Yellow Wax. The prepared Honey-comb of Apis mellifica, The Hive Bee. British and imported.

Description. When the honey has been separated from the comb, the remaining portion melted constitutes yellow wax. This when bleached forms white wax. The yellow occurs in large irregular masses, firm, breaking with a granular fracture, with an agreeable honey-like odour; the white, in thin cakes, hard, white, and odourless. Neither yellow nor white wax is unctuous to the touch.

Prop. & Comp. Yellow wax does not melt under 140°, yields nothing to cold rectified spirit, but is entirely soluble in oil of turpentine; the white wax does not melt under 150°. Boiling water in which wax has been agitated, when cooled is not rendered blue by iodine.

Wax is separable by means of alcohol into three portions: *myricine*, almost insoluble in boiling alcohol; *cerine*, called also *cerotic acid*, soluble in boiling alcohol, but deposited when the liquid becomes cold; and *ceroleine*, which remains in solution in cold alcohol. These substances exist in different proportions in different specimens of wax. Myricine, by the action of potash, may be converted into palmitic acid, and a neutral substance, melissine; this substance, by oxidation, yields an acid, the melissic, which bears the same relation to melissine that acetic acid does to alcohol. In some varieties of wax a substance, cerotine, exists, which stands in the same position with regard to cerotic acid as melissine does to melissic acid.

Off. Prep.—Of White Wax. Unguentum Simplex. Simple Ointment. (White wax, two ounces; prepared lard, three ounces; almond oil, three fluid ounces.) [Ceratum Adipis. Cerate of Lard. Ceratum simplex. Pharm. 1850. Lard, eight ounces; white wax, four troy ounces. U. S.]

Yellow wax is contained in Unguentum Cantharidis, Unguentum Resinæ, Unguentum Terebinthinæ, and in some of the plasters, and white wax in Unguentum Plumbi Acetatis and Unguentum Sabinæ.

Therapeutics. Demulcent, chiefly used in the preparations above-mentioned, to give them consistence.

HEMIPTERA.

Coccus. Cochineal. Coccus Cacti. The female Cochineal insect dried; reared in Mexico and Teneriffe.

Description. Of an oval form, convex on one side, flat and slightly concave on the other, about two lines long, wrinkled. One variety is of a reddish-gray colour, due to the presence of a white powder upon the red surface; this powder when examined by the microscope, has the appearance of fine wool; the other, nearly black, and having but little of the white powder. The female insects are alone preserved; they are procured by brushing them off into bags, and killing them by immersion in hot water. The difference in the two varieties, the silver and the black grains, consists in this; the silver is made up of the impregnated female just before she has hatched her eggs; the black, of the insect after the eggs have been laid and hatched. Cochineal yields when crushed a puce-coloured powder. The gray insect becomes black when warmed before the fire.

Prop. & Comp. Cochineal consists of fatty matters, salts, &c., and a peculiar colouring matter called *carmine:* it occurs in the form of small grains of a purple-red colour, soluble in water and alcohol. Acids increase the red colour, while alkalies render it violet. The colouring matter of carmine has been found to have acid properties, and has been called Carminic acid (C_{28} H_{14} O_{16}).

Off. Prep. Tinctura Cocci. Tincture of Cochineal. [Not officinal in U. S. P.] (Cochineal, in powder, two ounces and a half; proof spirit, twenty fluid ounces. Prepared by maceration.)

Therapeutics. Chiefly used as a colouring matter, much employed in the arts as a dye; it was formerly much esteemed in the treatment of pertussis.

Dose. Of the tincture, 30 min. to 1½ fl. drm.

Adulteration. Inferior cochineal is sometimes covered with some white powder, as talc, sulphate of baryta, or carbonate of lead, to give it the appearance of the finer variety; also with bone black, to give it the black colour.

COLEOPTERA.

Cantharis. Cantharides. Cantharis vesicatoria, Lytta vesicatoria; the Blister Beetle, or Spanish Fly; collected in Russia, Sicily, and Hungary.

Description. The insect is from 8 to 10 lines long; the elytra or wing-sheaths are long, of a fine green colour, and encase two thin brownish membranous wings. The flies swarm upon the trees about May or June, especially on the ash, lilac, and privet; and are brushed off by persons carefully masked, and received into linen cloths; they are killed by plunging into boiling vinegar, and then dried.

Prop. & Comp. The beetles have a peculiar urinous disagreeable odour, and a burning taste; the powder is a grayish brown, containing shining green particles; it should be free from mites. In addition to oily and fatty matters, the beetles contain a crystallizable principle, *Cantharidine*, to which their active properties are due. Cantharidine is insoluble in water, nearly so in cold alcohol, but more soluble in ether, chloroform, and strong acetic acid; as the active properties of the insect are partially yielded to warm and cold alcohol, it would appear that the cantharidine exists in the beetle as a somewhat soluble compound. From 1,000 parts of the flies, about four parts of pure cantharidine have been procured; catharidine has the formula (C_{10} H_6 O_4); it may be sublimed without injury; it has very powerful vesicating properties.

Off. Prep. Emplastrum Cantharidis. Cantharides Plaster. (Cantharides, in very fine powder, twelve ounces; yellow wax, seven ounces and a half; prepared suet, seven ounces and a half; resin, three ounces; prepared lard, six ounces.)

Emplastrum Calefaciens. Warm Plaster. (Cantharides in coarse powder, four ounces; boiling water, twenty fluid ounces; expressed oil of nutmeg, four ounces; yellow wax, four ounces; resin, four ounces; soap plaster, three pounds and a quarter; resin plaster, two pounds.)

Linimentum Cantharidis. Cantharides, in powder, eight ounces; acetic acid, four fluid ounces; ether, twenty fluid ounces. Prepared by maceration and percolation.) [Cantharides, in fine powder, a troy ounce; oil of turpentine, half a pint. Prepared by maceration and percolation. U. S.]

[Ceratum Cantharidis. Cerate of Cantharides. Blistering Cerate. Cantharides, in very fine powder, twelve troy ounces; yellow wax, resin, each, seven troy ounces; lard, ten troy ounces. U. S.]

Tinctura Cantharidis. Tincture of Cantharides. (Cantharides, in coarse powder, a quarter of an ounce; proof spirit, twenty fluid ounces. Prepared by maceration and percolation.) [Two pints of tincture are obtained by percolating a troy ounce of cantharides in fine powder with diluted alcohol. U. S.]

Unguentum Cantharidis. Ointment of Cantharides. [Not officinal in U. S. P.] (Cantharides one ounce; yellow wax, one ounce; olive oil, six fluid ounces.)

Acetum Cantharidis. Vinegar of Cantharides. London Ph., 1851. (Spanish flies, reduced to the finest powder, two ounces; acetic acid, one pint. Macerate for eight days with the acid, frequently shaking them; then press and strain.)

Therapeutics. Cantharides, when applied externally, produce at first rubefacient and irritant effects, followed, if the preparation is strong, or long continued, by vesication; not unfrequently the active principle becomes absorbed, and the symptoms resulting from its internal administration then ensue. When taken internally in medicinal doses, the first indication is generally some diuresis, with a slight sensation referred to the neck of the bladder; and if the urine be then examined, it usually gives an indication of a trace of albumen; sometimes also a few blood disks are discovered by the microscope: when continued beyond this, strangury and bloody urine are produced, with priapism, sometimes aphrodisiac effects, and diminution or suppression of urine and its sequences, convulsions and death; the spinal cord is supposed to be influenced by cantharides.

Externally the Spanish fly is often used as a rubefacient in the form of a liniment, made with the tincture or acetum cantharidis, in cases where rubefacients in general are indicated; it has

the advantage of acting slowly and for a longer period, and being less irritating to the patient, than strong ammoniacal or acetic acid embrocations: as a vesicant, its employment is very general, more so than that of any other agent; it forms the basis of the common blister, or emplastrum cantharidis, of liniment of cantharides, and of other non-officinal blistering applications, as the vinegar of cantharides, &c.; the ointment is used to keep open blistered surfaces. These applications are useful over inflamed deep-seated parts, as in pleuritis, pericarditis, pneumonia, and other internal inflammations, after the more active febrile symptoms have been subdued by depletion and antiphlogistic remedies; and to diseased and painful joints. Vesication is also made use of on account of its revulsive action in internal congestions, as of the head, &c.; and over painful parts unattended with inflammatory action, as in various neuralgic affections; and lastly, in diseased conditions of the skin itself.

Internally the tincture of cantharides is given in chronic affections of the nervous system, especially of the spinal cord, as in chronic forms of paraplegia and in incontinence of the urine from want of tone in the bladder; occasionally it has been found useful in some non-inflammatory forms of albuminura, and in hydrocephalus; also in skin affections, especially in those of a squamous character; probably its diuretic action may be the cause of its value in the latter class of diseases. Sometimes it has been given in gleet and other mucous discharges.

Precautions to be used in the application and administration of Cantharides.

When the kidneys are acutely affected, the use of the Spanish fly, externally or internally, should be avoided, as the cantharidine is apt to become absorbed; in young or very debilitated subjects vesication by this agent should be cautiously produced, as sloughing may ensue and prove troublesome and even dangerous: placing a piece of tissue-paper over the surface and removing the blistering application before vesication has been fully induced, and the subsequent application of a poultice will often prevent the occurrence of strangury, and, at the same time, too great injury to the skin; vesication will generally ensue after the

poultice has been applied. Many substitutes for the ordinary blistering plaster have been proposed, such as the tela vesicatoria and blistering papers made by mixing an etherial or oily solution of cantharides with wax and fatty matters, and spreading the compound thinly on cloth or tissue-paper; also blistering liquids prepared by dissolving *cantharidine* in acetic acid and ether, or chloroform: the liniment of the Pharmacopœia, which the author has extensively employed, vesicates with much certainty; it should, however, be used somewhat cautiously. These liquid applications are more efficient than the acetum cantharidis, as blistering agents, but the latter may be used as a rubefacient.

Dose. Of tinctura cantharidis, 5 min. to 30 min.

Adulteration. A beetle called the golden beetle has been found mixed with cantharides, and occasionally artificial glass tubes or beads coloured to imitate the Spanish fly have been added to increase the weight. It has been also asserted that flies deprived of their virtues by ether have been sold as genuine, and that euphorbium resin has been employed as an adulteration to powdered cantharides.

Several other coleopterous insects, as Mylabris chicorii, &c., possess vesicating powers, and have been used in other countries as blistering agents.

CLASS, ANNELIDA.

Hirudo. The Leech. Sanguisuga officinalis, the Speckled Leech; and Sanguisuga medicinalis, the Green Leech. Imported chiefly from Hamburg.

Description. Leeches have an elongated body, 2 or 3 inches long, tapering to each end, plano-convex, wrinkled transversely; of an olive-green colour on the back; made up of from 70 to 90 soft rings, with a muscular disc at both extremities, the hinder one the largest; the mouth, which is in the anterior disc, is tri-radiate, and contains three jaws, each of which is furnished with two rows of teeth; the intestinal canal is straight.

The Sanguisuga medicinalis is distinguished by the olive-green colour of the belly, which is unspotted; in the Sanguisuga officinalis the belly is of a yellowish-green colour, spotted with black.

Both are marked with six rusty-coloured longitudinal stripes; in the latter variety these also are spotted with black.

Therapeutics. Leeches are employed for the local abstraction of blood from those parts where cupping is not deemed advisable. The quantity of blood drawn by a leech is about one fluid drachm and a half, though by fomentation of the part perhaps half a fluid ounce may be obtained.

Bleeding from leech-bites may be stopped by pressure, by matico, by the application of collodion or of caustic; sometimes they require a suture.

CLASS, PORIFERA.

Spongia Usta. Burnt Sponge. (Not officinal.)

Sponges, of which there are very many varieties, inhabit the bottom of the sea, where they are fixed to rocks. The best are obtained from the Mediterranean and Red Seas, inferior qualities from the West Indies.

Description. Sponge is prepared for use by steeping it for some days in cold water, the concretions which it contains being separated by occasional beatings. It is afterwards washed in water acidulated with hydrochloric acid, by which the remainder of the earthy particles are removed: in addition, it is often bleached with sulphurous acid. The general appearance of the sponge is too well known to need description. When burnt, sponge yields the article, formerly officinal, termed spongia usta, which occurs as a blackish-brown powder.

Prop. & Comp. Sponge consists of gelatinous matter, and various salts of lime, potash, magnesia, &c. Burnt sponge contains a large amount of carbon, mixed with carbonate and sulphate of lime, chloride of sodium and iron; also from 1 to 2 per cent. of iodide of potassium, with some bromide. It is upon the presence of these latter constituents that its medicinal properties depend.

Therapeutics. *Spongia usta*, or burnt sponge, has been much recommended in goître and strumous glandular swellings, in which cases it is still sometimes given. In addition to its use for domestic purposes, sponge is sometimes used in the form of a tent.

Dose. Of burnt sponge, 30 gr. to 100 gr. or more, made into an electuary, sometimes given in lozenges.

TEST-SOLUTIONS

FOR QUANTITATIVE AND QUALITATIVE ANALYSES OF SUBSTANCES CONTAINED IN THE PHARMACOPŒIA;

WITH AN EXPLANATION OF THEIR MORE IMPORTANT APPLICATIONS.

SOLUTION OF ACETATE OF COPPER.

Prep. By digesting half an ounce of subacetate of copper in fine powder with one fluid ounce of acetic acid diluted with half a fluid ounce of water, at a temperature not exceeding 212°, with repeated stirring, till a dry residue is obtained. Then dissolving this in sufficient water to make the solution measure five ounces. In this process the subacetate ($2\ CuO, C_4 H_3 O_3$) is made to assume another equivalent of acetic acid, and is thus converted into the acetate ($CuO, C_4 H_3 O_3$).

Use. It is used in the Pharmacopœia for detecting the presence of butyric acid in valerianate of zinc, the valerianate being often adulterated with the butyrate, to which a few drops of oil of valerian are added to simulate the odour of valerian. The suspected salt is first distilled with sulphuric acid, and the solution of acetate of copper added to the distillate; pure valerianic acid gives, under these circumstances, no precipitate, but if any butyric acid is present, a bluish-white precipitate of butyrate of copper is produced. The butyrate of copper is a sparingly soluble salt, and is represented by the formula ($CuO, C_8 H_7 O_3 + 2\ HO$).

SOLUTION OF ACETATE OF POTASH.

Prep. Made by dissolving half an ounce of acetate of potash ($KO, C_4 H_3 O_3$) in five fluid ounces of distilled water.

Use. This solution is employed to distinguish between tartaric and citric acids. When added to a solution of citric acid no precipitate takes place, but with tartaric acid, the sparingly soluble bitartrate of potash is precipitated (HO, KO, C_8 H_4 O_{10}).

SOLUTION OF ACETATE OF SODA.

Prep. By dissolving half an ounce of acetate of soda (Na O, C_4 H_3 O_3+6HO), in five fluid ounces of distilled water.

Use. It is directed to be added in excess to the solution of phosphate of lime in nitric acid, previous to the addition of oxalate of ammonia and perchloride of iron; the nitric acid is thus neutralized, and the oxalate of lime and phosphate of iron are insoluble in the acetic acid, which is then set free.

SOLUTION OF ALBUMEN.

Prep. The white of one egg is well triturated in a mortar with four ounces of distilled water, and filtered through clean tow, previously moistened with distilled water.

Use. This is used for testing phosphoric acid. The phosphoric acid, which is the tribasic variety, is not precipitated by albumen, this test distinguishes it from the monobasic phosphoric acid; both the monobasic and bibasic varieties give white precipitates with nitrate of silver, but the latter does not precipitate albumen, while the former does. *Creosote* also coagulates the solution of albumen, which property is given in the Pharmacopœia as one of its characteristics.

SOLUTION OF AMMONIO-NITRATE OF SILVER.

Prep. One quarter of an ounce of nitrate of silver in crystals (Ag O, NO_5), is dissolved in eight fluid ounces of distilled water, and half an ounce or a sufficiency of solution of ammonia added so as nearly to redissolve the precipitate which is at first formed. The ammonio-nitrate of silver is represented by the formula (Ag O, NO_5+2 NH_3).

Use. This is directed to be used for testing arsenious acid and phosphoric acid, with the aqueous solutions of which it gives a yellow precipitate of arsenite and phosphate of silver, which are soluble in excess both of ammonia and nitric acid.

SOLUTION OF AMMONIO-SULPHATE OF COPPER.

Prep. By dissolving half an ounce of crystallized sulphate of copper in eight fluid ounces of distilled water, and adding solution of ammonia to the solution until the precipitate formed at first is nearly dissolved, filtering and adding sufficient distilled water to the clear solution to make it measure ten fluid ounces.

The ammonio-sulphate of copper is represented by the formula ($CuO, SO_3 + 2\ NH_3, HO$).

Use. Ammonio-sulphate of copper may be employed in lieu of ammonio-nitrate of silver as a test for the presence of arsenious acid. It gives a green precipitate (Scheele's green) which is soluble in excess of ammonia.

SOLUTION OF AMMONIO-SULPHATE OF MAGNESIA.

Prep. By dissolving one ounce of sulphate of magnesia, and half an ounce of hydrochlorate of ammonia, in eight fluid ounces of distilled water, afterwards adding half a fluid ounce of solution of ammonia, and enough distilled water to make up the bulk to ten fluid ounces.

The composition of the ammonio-sulphate of magnesia is represented by the formula ($Mg\ O, SO_3 + NH_4\ O, SO_3 + 6\ HO$).

Use. The solution is used for testing phosphate of ammonia. When added to a solution of that salt, a crystalline precipitate of ammonio-magnesian phosphate is formed, this is also known as the triple phosphate, and has the composition ($2\ Mg\ O, NH_4\ O, PO_5 + 12\ HO$); it is but very sparingly soluble in pure water, and insoluble in water containing chloride of ammonium or ammonia, but readily soluble in acids. When dried and heated to redness, this salt yields 35·7 per cent. of magnesia, and 64·3 of phosphoric acid. According to the direction of the Pharmacopœia, twenty grains of phosphate of ammonia when precipitated by this test-solution, and the precipitate washed with solution of ammonia diluted with an equal bulk of water, should, when dried and heated to redness, leave a residue of 11·44 grains.

The solution is also made use of to determine the presence of phosphoric acid in the phosphate of iron. For this purpose the

salt is dissolved in hydrochloric acid, tartaric acid and excess of ammonia added, and then the test-solution, when the ammonio-magnesian phosphate is precipitated. Ammonia would precipitate the iron if added alone, but with the tartaric acid a soluble compound, ammonio-tartrate of iron, is formed, and the iron is thus held in solution.

SOLUTION OF BICHLORIDE OF PLATINUM.

Prep. Directions for making this solution are given under Platinum, page 111.

Use. This solution is used for testing the presence and absence of potash, in various substances; it forms with potash a double chloride, K Cl, Pt Cl_2, very sparingly soluble in water, insoluble in ether and alcohol; with soda, on the other hand, no precipitate is formed, and hence it is used to distinguish between the potash and soda compounds. With this view it is applied to test potash, sulphate of potash, bicarbonate and carbonate of potash, the chlorate, the citrate, the permanganate and the acid tartrate of potash, the bicarbonate and carbonate of soda, chloride of sodium, and liquor sodæ chloratæ.

The solution of bichloride of platinum is also used as a test for the presence of nicotine in the distillate obtained by distilling tobacco leaves with solution of potash. It forms with that substance a yellow crystalline precipitate, a double chloride of platinum and nicotine.

SOLUTION OF BORACIC ACID.

Prep. Made by dissolving fifty grains of boracic acid (BO_3 + 3 HO) in one fluid ounce of rectified spirit.

Use. It is used in the Pharmacopœia to test the presence of turmeric in rhubarb. Turmeric becomes of a red colour when treated with the solution of boracic acid, whereas the colouring matter of rhubarb is unaffected by this reagent.

SOLUTION OF BROMINE.

Prep. A solution of ten minims of bromine in five fluid ounces of distilled water.

Use. This solution is employed in testing bromide of potassium, to determine whether any iodide be present. A few drops are added to a solution of the salt mixed with mucilage of starch: if any iodine be present in the bromide the blue iodide of starch is formed.

SOLUTION OF CARBONATE OF AMMONIA.

Prep. Made by dissolving half an ounce of carbonate of ammonia in eight fluid ounces of water, and subsequently adding sufficient water to make up the bulk of the solution to ten fluid ounces.

Use. Used in testing the carbonate and oxide of zinc. These substances, dissolved in water by the aid of a little nitric acid, give a white precipitate (carbonate of zinc) with the solution of carbonate of ammonia, which is entirely soluble without colour in excess of the reagent. This test serves to distinguish zinc from alumina and the alkaline earths, including magnesia, &c.

SOLUTION OF CHLORIDE OF BARIUM.

Prep. An ounce of chloride of barium, in crystals, is dissolved first in eight fluid ounces of water, and sufficient water then added to make the solution measure ten fluid ounces.

Use. Chloride of barium forms with sulphuric acid and the soluble sulphates a white precipitate of sulphate of baryta, a very insoluble compound, scarcely acted upon even by boiling nitric acid. The solution of chloride of barium is used as a test for sulphuric acid and the sulphates, and for this purpose is applied to nearly all the inorganic substances in the list of the Materia Medica, and also to some of the organic.

SOLUTION OF CHLORIDE OF CALCIUM.

Prep. One ounce of chloride of calcium is dissolved in eight fluid ounces of distilled water, and sufficient water is added to make the bulk of the solution ten fluid ounces.

Use. This solution is used as a means of recognizing citric acid in citrate of potash. Citric acid forms with lime the citrate of lime, a salt which has the peculiarity of being soluble in cold

water, but insoluble in hot, so that when the solution of calcium is added to the solution of citrate of potash, no precipitate occurs until the solution is boiled, when a white precipitate separates, which is readily soluble in acetic acid. The production, with chloride of calcium, of a white precipitate of arseniate of lime (2 Ca O, HO; As O_5) soluble in nitric acid, is also given as one of the characteristic reactions of a solution of arseniate of soda.

SATURATED SOLUTION OF CHLORIDE OF CALCIUM.

Prep. Made by dissolving three hundred and thirty-six grains of chloride of calcium in one fluid ounce of distilled water.

Use. This solution, like the chloride of calcium itself, has a very strong absorbing power for water. It is used in the Pharmacopœia as a test for the purity of the spirits of nitrous ether. When one volume of the spirits of nitrous ether is agitated with two volumes of the solution of chloride of calcium, one and a half per cent. by volume of nitrous ether separates and rises to the surface. In this case the water, alcohol, &c., which are present are absorbed by the solution, and the pure ether separates.

SOLUTION OF CHLORIDE OF TIN.

Prep. By dissolving one ounce of granulated tin in three fluid ounces of hydrochloric acid, diluted with one fluid ounce of distilled water, with a moderate heat, until gas ceases to be evolved, and subsequently adding sufficient distilled water to make up the bulk to five fluid ounces. The solution, together with the undissolved tin, should be transferred to a well stoppered bottle.

Use. This is a solution of the protochloride of tin (Sn Cl). Protochloride of tin absorbs oxygen and chlorine very readily, and is a powerful deoxidizing agent. It reduces to the metallic state the salts of mercury, silver, gold, &c.; and the solution is often made use of for precipitating mercury from its combinations. It is used in the Pharmacopœia for this purpose. The ammoniated mercury boiled with the solution of chloride of tin becomes grey, and deposits globules of metallic mercury.

SOLUTION OF CORROSIVE SUBLIMATE.

Prep. One hundred grains of corrosive sublimate are dissolved

in five fluid ounces of distilled water, and preserved in a bottle impervious to light.

Use. This solution has the power of coagulating albumen, with which it forms a very insoluble compound; and it yields with iodide of potassium a precipitate which is at first salmon-coloured, but soon changes into brilliant scarlet crystals, and may, therefore, be used as a test for iodide of potassium.

SOLUTION OF FERROCYANIDE OF POTASSIUM.

Prep. By dissolving a quarter of an ounce of ferrocyanide of potassium (crystals) in five fluid ounces of distilled water.

Use. Ferrocyanide of potassium forms insoluble precipitates with many of the metals, and is used as a test for their presence; the colour of the precipitate is sometimes sufficient to indicate the nature of the metal present in solution. Thus it gives a blue precipitate with the persalts of iron, a reddish-brown one with those of copper, and a white or nearly white precipitate with protosalts of iron, manganese, zinc, tin, cadmium, lead, bismuth, antimony, mercury, and silver.

SOLUTION OF FERRIDCYANIDE OF POTASSIUM.

Prep. By dissolving a quarter of an ounce of ferridcyanide of potassium in five fluid ounces of water.

Use. This solution is used as a test of the presence of the protoxide of iron, with which it forms a blue precipitate; with a solution of the peroxide it gives no precipitate, and hence affords a means of distinguishing between the proto- and per-salts of this metal.

SOLUTION OF GELATINE.

Prep. Fifty grains of isinglass, cut into shreds, and one fluid ounce of distilled water, are mixed and digested for half an hour with repeated shaking on a water bath, and the solution filtered through clean tow moistened with distilled water.

Use. The solution is used to distinguish between gallic and tannic acid; the former gives no precipitate with gelatine, while the latter gives a yellowish-white one; it is also employed to detect tannic acid in a decoction of elm bark, with which it should afford a precipitate.

SOLUTION OF HYDROCHLORATE OF AMMONIA.

Prep. By dissolving one ounce of hydrochlorate of ammonia in eight fluid ounces of distilled water, and afterwards making up the solution with distilled water to ten fluid ounces.

Use. It is used as a test under the heads of Magnesia, Carbonate and Sulphate of Magnesia, and Chloride of Iodium.

The solution of hydrochlorate of ammonia with a little free ammonia is mixed with the solution of the substance to be tested, and phosphate of soda is afterwards added, when the magnesia present is precipitated in the form of the ammonio-magnesian phosphate. No precipitate of this salt will take place (except in a very concentrated solution of magnesia) unless hydrochlorate of ammonia be present. A solution of chloride of sodium when treated in a similar manner should give no precipitate, showing the absence of magnesia. The precipitates caused in a solution of magnesian salts by potash, soda, and ammonia, and by the carbonate of potash and soda, are all soluble in hydrochlorate of ammonia.

SOLUTION OF HYDROSULPHURET OF AMMONIA.

Prep. By passing a stream of sulphuretted hydrogen gas into one fluid ounce of solution of ammonia as long as the gas continues to be absorbed.

Use. The solution of hydrosulphuret of ammonia is used to precipitate various metals from solution. It is employed to determine the presence of zinc in the salts of that metal; it gives with them a white precipitate of sulphide of zinc, which is very characteristic. Hydrosulphuret of ammonia gives rise to no precipitate in neutral solutions containing arsenious and arsenic acid, but an orange-red precipitate with neutral solutions of antimony, soluble in excess of the reagent.

Salts of mercury, silver, lead, copper, bismuth, tin, gold, and platinum, are precipitated as brown or black sulphides by the solution of hydrosulphuret of ammonia. The precipitates formed with the protoxide of tin, and the peroxides of gold and platinum, are soluble in excess of the reagent; the sulphide of tin requires a large excess.

SULPHURETTED HYDROGEN GAS.

Sulphuretted hydrogen, prepared by the action of sulphuric acid on sulphuret of iron, is also much used as a test for the metals. Sulphuretted hydrogen gives *yellow* precipitates in neutral solutions containing arsenious or arsenic acid, which are soluble in ammonia and hydrosulphuret of ammonia, but insoluble in excess of hydrochloric acid; it also yields a *yellow* precipitate in solutions of the persalts of tin; the precipitate is however soluble in hydrochloric acid. It gives brown or black precipitates in *acid solutions* of the following metallic bases :—proto- and per-salts of mercury, salts of silver, lead, copper, bismuth, protoxide of tin, gold, and platinum. The precipitate with the persalts of mercury is at first yellow, but becomes black with excess of sulphuretted hydrogen. Salts of the following metals (contained in the Pharmacopœia) are not precipitated by hydrosulphuric acid in *acid* solutions: the proto- and per-salts of iron, oxide of zinc, and manganese.

SOLUTION OF IODATE OF POTASH.

Prep. By rubbing together to a fine powder, fifty grains of iodine, and fifty grains of chlorate of potash, then pouring upon it half an ounce of distilled water with five minims of nitric acid, and digesting in a Florence flask with a gentle heat until the colour of the iodine disappears; then boiling for one minute, transferring the contents of the flask to a capsule, and evaporating to perfect dryness at 212°. The residue should be dissolved in ten ounces of distilled water and the solution kept in a stoppered bottle. In this process, by the powerful oxidizing agency of the nitric and chlorate of potash upon the iodine, the iodate of potash is formed.

Use. Iodate of potash is used for ascertaining the freedom of acetic acid and glacial acetic acid from sulphurous acid. When added to acetic acid previously mixed with mucilage of starch, if no sulphurous acid be present, no change is produced; but if sulphurous acid be present, the iodate is decomposed, iodide of potassium is formed, as represented in the following equation: (KO,

$IO_5 + 6\,(HO, SO_2) = KI + 6\,(HO, SO_3)$, and the iodine liberated, which gives rise to a blue colour with the starch.

SOLUTION OF IODIDE OF POTASSIUM.

Prep. Made by dissolving one ounce of iodide of potassium in eight ounces of distilled water, and making up the solution to ten fluid ounces.

Use. The solution of iodide of potassium is used as a test for the presence of lead, in the oxide, the acetate, and the carbonate of that metal. The oxide (litharge) and the carbonate are dissolved in water, with the aid of a little nitric acid, the acetate in distilled water alone, and the solution of iodide of potassium is added; a bright-yellow precipitate of iodide of lead is produced: it is precipitated at first as a yellow powder, sparingly soluble in cold, but more soluble in hot water, the solution, as it cools, depositing the iodide in beautiful yellow spangles.

SOLUTION OF OXALATE OF AMMONIA.

Prep. Made by first neutralizing a solution of one ounce of purified oxalic acid in eight ounces of boiling distilled water, with carbonate of ammonia; filtering the solution, cooling, and allowing the oxalate of ammonia to crystallize. The crystals have the composition ($NH_4O, C_2O_3 + HO$). Of these crystals, dried on filtering paper by simple exposure to air, and free from efflorescence, half an ounce is dissolved in one pint of distilled water.

Use. The solution of oxalate of ammonia is used for detecting the presence of lime in solution. It forms, in very dilute neutral or alkaline solutions of the salts of lime, a precipitate of oxalate of lime, which is insoluble in acetic acid, but soluble in nitric and hydrochloric acids. It is applied for this purpose to test many of the Pharmacopœia substances—tartaric and citric acids, liquor ammoniæ fortior, creta preparata, calcis phosphas, calx, carbonate and citrate of lithia, sulphate of magnesia, and many other substances in the Materia Medica.

SOLUTION OF PHOSPHATE OF SODA.

Prep. Made by dissolving one ounce of phosphate of soda, in crystals, in eight fluid ounces of distilled water, subsequently made up to ten fluid ounces.

Use. The solution is used under Magnesia, Carbonate and Sulphate of Magnesia, to test the presence of that base, by the formation of the ammonio-magnesian phosphate, as noticed under the solution of hydrochlorate of ammonia. Also under Carbonate of Lithia, the chloride of which is precipitated by the solution of phosphate of soda, as phosphate of lithia.

SOLUTION OF SULPHATE OF INDIGO.

Prep. Made by digesting for an hour, with the aid of the heat of a water-bath, five grains of indigo in one fluid drachm of pure sulphuric acid; then pouring the solution into ten fluid ounces of distilled water, and after thoroughly mixing by agitation, allowing any undissolved matter to subside, and decanting off the the clear liquid for use.

Use. This solution, which contains the sulphate of indigo ($HO, C_{16} H_4 NO, 2 SO_3$), when in contact with free chlorine or bodies containing chlorine in a feeble state of combination, becomes decolorized, hence its value as a test. It is employed under Chlori Liquor, Sodæ Chloratæ Liquor, &c.

SOLUTION OF SULPHATE OF IRON.

Prep. Made by dissolving ten grains of granulated sulphate of iron in one fluid ounce of boiling distilled water. It should be recently prepared.

Use. This is a solution of the protosulphate of iron; in contact with nitric acid and oil of vitriol it becomes of a dark purple colour.

It is employed under Acidum Nitricum, Acidum Phosphoricum, Acidum Sulphuricum, Ætheris Nitrosi Spiritus, &c.

SOLUTION OF SULPHATE OF LIME.

Prep. Made by rubbing a quarter of an ounce of plaster of Paris (sulphate of lime, dried), in a porcelain mortar with two fluid ounces of distilled water, and then adding the milky fluid to eighteen fluid ounces of water, and after allowing the undissolved sulphate to subside, decanting off the clear solution for use.

Use. This solution gives rise to a precipitate (oxalate of lime) when treated with oxalic acid or a soluble oxalate; it is used under Acidum Tartaricum to ascertain the absence of oxalic acid.

SOLUTION OF TARTARIC ACID.

Prep. Made by dissolving an ounce of crystallized tartaric acid in eight fluid ounces of distilled water, and adding to it two fluid ounces of rectified spirit.

The spirit is employed on account of the liability of the watery solution of tartaric acid to become opaque from the formation of a vegetable growth.

Use. The solution of tartaric acid is used in the Pharmacopœia for the purpose of ascertaining the presence of potash; for if added in excess to any solution containing that base, a very insoluble salt, the acid or bitartrate of potash, is formed and precipitates. Again, tartaric acid prevents the precipitation of oxide of antimony when an acid solution of this metal is added to water.

It is employed under Alumen and Potassæ Acetas; also under Antimonii Terchloridi Liquor, and Antimonium Tartaratum.

SOLUTION OF TERCHLORIDE OF GOLD.

Prep. Made by dissolving, with the aid of heat, sixty grains of fine gold in thin laminæ, in a dilute nitro-hydrochloric acid made by mixing one fluid ounce of nitric acid, six fluid ounces of hydrochloric acid, and four fluid ounces of distilled water; then adding an additional fluid ounce of hydrochloric acid and evaporating at a temperature not above 212° Fah., until acid vapours cease to be given off; and lastly, dissolving the terchloride of gold which remains in five fluid ounces of distilled water.

Use. This solution contains terchloride of gold ($Au\ Cl_3$), and is employed for the purpose of distinguishing the alkaloid atropine, which forms with it a double salt, chloride of gold and atropine; crystallizing in yellow plumous needles.

In addition to these solutions, the volumetric solutions of *nitrate of silver* and of *iodine* are also made use of as test-solutions for

qualitative analysis. *Nitrate of silver* is used as a test for hydrochloric acid and the chlorides, with which it forms a curdy white precipitate (chloride of silver), soluble in excess of ammonia, but insoluble in nitric acid ;—for hydrocyanic acid and the cyanides, with which it forms a white cyanide of silver, entirely soluble in boiling nitric acid ;—for tribasic phosphoric acid with which it gives a yellow phosphate of silver, soluble in excess both of nitric acid and ammonia ;—for arsenic acid, with which it gives a brick-red precipitate of arseniate of silver, soluble in excess of nitric and ammonia. It is also used as a test for the purity of rectified spirit. The solution of iodine is used as a test for starch in various substances, as in calumbo, gamboge, catechu, scammony, flour of mustard, &c.

VOLUMETRIC SOLUTIONS.

In making use of the volumetric solutions a graduated tube or alkalimeter is employed, which when filled to 0, holds 1,000 grains of distilled water at 60°; it is divided into a hundred parts of equal capacity, so that each division will contain ten grains of distilled water at 60°. The graduation should be carefully made, the object being to note, with as much accuracy as possible, the number of measures of the solution required to produce a certain effect. With regard to the alkaline and acid test-solutions, but little need be said. The solution of soda for estimating the strength of acids is so prepared that a hundred measures of the solution contain thirty-one grains of soda; the equivalent of soda being thirty-one, it is evident that this quantity will neutralize an equivalent in grains of any monobasic acid. The solution of oxalic acid for determining the amount of alkali is of such a strength that a hundred measures of the solution contain sixty-three grains of oxalic acid, and are therefore capable of neutralizing an equivalent in grains (sixty-three being the equivalent of crystallized oxalic acid) of any alkali or alkaline carbonate, thirty-one grains of soda, forty-seven of potash, &c., &c.

The following are the directions given in the Pharmacopœia for the preparation of the volumetric solution of soda and oxalic acid.

VOLUMETRIC SOLUTION OF SODA.

(Soda, NaO=31.)

(Take of solution of soda, a sufficiency; distilled water, a sufficiency.) Fill the volumetric tube to 0 with the solution of soda, and drop this into sixty-three grains of purified oxalic acid dissolved in two fluid ounces of the water, until the acid is

exactly saturated, as indicated by litmus. Note the number of measures (N) of the solution used, and having then taken forty fluid ounces of the solution of soda, augment this quantity by the addition of distilled water, until it becomes $\frac{4000}{N}$ fluid ounces. If, for example, N=93, the forty ounces of solution of soda should be diluted so as to become $^{4}\frac{0}{9}\frac{0}{3}^{0}$=43·01.

The quantity of this solution which fills the volumetric tube to 0, includes thirty-one grains of soda, and will therefore neutralize an equivalent in grains of any monobasic acid.

VOLUMETRIC SOLUTION OF OXALIC ACID.

(Oxalic acid crystallized, HO, $C_2 O_3$+2 HO=63.)

(Take of purified oxalic acid in crystals quite dry, but not effloresced, 551·25 grains; distilled water, a sufficiency.) Dissolve the oxalic acid in eighteen fluid ounces of the water, and when the solution is complete add as much distilled water as will make its bulk exactly twenty fluid ounces at 60°.

The quantity of the solution which fills the volumetric tube to 0, includes exactly sixty-three grains of crystallized oxalic acid, and is therefore capable of neutralizing an equivalent in grains of any alkali or alkaline carbonate.

With respect to the four other volumetric solutions introduced into the Appendix, a few words of explanation may here be offered.

VOLUMETRIC SOLUTION OF BICHROMATE OF POTASH.

(Bichromate of Potash, KO, 2 CrO_3=147·5.)

(Take of pure bichromate of potash, one hundred and twenty grains; distilled water, one pint. Dissolve.) Of the bichromate of potash solution, one hundred measures contain 14·75 (or $\frac{1}{10}$ of an equivalent) in grains of that salt. It is used to determine the amount of a protosalt of iron present in a liquid. When the bichromate is added to a solution of a protosalt of iron in hydrochloric acid, the proto- is converted into per-salt, and by ascertaining the amount of the solution necessary to complete this change, the quantity of protosalt present can be estimated. The nature of the decompositions which occur may be represented by

the following formula, KO, 2 CrO_3+6 FeO+4 H Cl=3 (Fe_2 O_3) + Cr_2 Cl_3+KCl+4 HO. Two equivalents of chromic acid (2 CrO_3), present in the bichromate, yield three equivalents of oxygen, which convert six equivalents of protoxide, 6 (FeO), into three of peroxide 3 (Fe_2 O_3). Consequently, 147·5, the equivalent in grains of bichromate of potash, is capable of converting, and will therefore represent, six equivalents in grains of protoxide of iron ; and one hundred measures of the volumetric solution, containing 14·75 grains of the bichromate, will represent 16·8 or $\frac{1}{10}$ of six equivalents of iron. When all the iron is converted into a persalt, a drop of the solution will no longer strike a blue colour with ferridcyanide of potassium.

VOLUMETRIC SOLUTION OF HYPOSULPHITE OF SODA.

(Hyposulphite of Soda crystallized, NaO, S_2 O_2+5 HO=124.)

(Take of hyposulphite of soda, in crystals, two hundred and sixty grains ; distilled water, a sufficiency.) Dissolve the hyposulphite of soda in one pint of the water, and drop the solution cautiously from the volumetric tube into one hundred measures of the volumetric solution of iodine, until the brown colour of the iodine is just discharged. Note the number of measures (N) which have been used to produce this effect ; and having then taken sixteen fluid ounces of the same solution augment this quantity by the addition of distilled water until it amounts to $\frac{1600}{N}$ fluid ounces. If for example, N = 96, the sixteen ounces of the solution of the hyposulphite should be diluted with distilled water so as to become $\frac{1600}{96}$ = 16·66 fluid ounces. One hundred measures of the solution of hyposulphite of soda contain 24·8 grains of the crystallized hyposulphite. It is employed for estimating free iodine. When the solution of hyposulphite is added to a liquid containing free iodine a decomposition takes place, which may be represented by the formula, 2 (NaO, S_2 O_3) + I = NaO, S_4 O_5 + Na I, iodide of sodium and tetrathronate of soda being formed, the solutions of which are devoid of colour. Hence, to decolorize one equivalent in grains of iodine, two equivalents in grains of the hyposulphite are required. Now one hundred measures of the volumetric solution contain 24·8 or $\frac{1}{10}$ of two equivalents in grains of the hyposulphite of soda, and

will therefore represent 12·7 or $\frac{1}{10}$ of one equivalent in grains of iodine.

VOLUMETRIC SOLUTION OF IODINE.

(Iodine, I = 127.)

(Take of purified iodine, in powder, 111·125 grains; iodide of potassium, one hundred and fifty grains; distilled water, a sufficiency. Mix the iodide of potassium and iodine in a bottle with eighteen ounces of the water, agitate until both are dissolved, and when the solution is complete, add as much more distilled water as will make the total bulk exactly one pint.) The volumetric solution of iodine is of such a strength, that one hundred measures include 12·7 grains (or $\frac{1}{10}$ of an equivalent) of iodine. It is dropped into the solution to be tested until free iodine begins to appear, and the number of measures added before this colour appears is carefully noted. It is principally used for the quantitative estimation of sulphurous and arsenious acid, all the sulphurous acid being converted into sulphuric, and the arsenious into arsenic acid, before any free iodine appears. The following equation represents the decompositions which occur, $SO_2 + I + HO = SO_3 + HI$; so that one equivalent of iodine is required to each equivalent of sulphurous acid, before any free iodine appears, and each equivalent of iodine will correspond to one equivalent of the sulphurous acid, or one hundred measures containing 12·7 grains (or $\frac{1}{10}$ of an equivalent) of iodine will represent 3·2 grains (or $\frac{1}{10}$ of an equivalent) of sulphurous acid. For the conversion of arsenious acid into arsenic, two equivalents of iodine will be required ($As\ O_3 + 2\ HO + 2\ I = As\ O_5 + 2\ HI$). So that one hundred measures of the volumetric solution will represent $\frac{1}{10}$ of half an equivalent of arsenious acid, or 4·95 grains.

It is also used for the estimation of sulphuretted hydrogen, one hundred measures of the solution representing 1·7 grains (or $\frac{1}{10}$ of an equivalent in grains) of sulphuretted hydrogen.

VOLUMETRIC SOLUTION OF NITRATE OF SILVER.

(Nitrate of Silver, $AgO, NO_5 = 170$.)

(Take of nitrate of silver, 148·75 grains; distilled water, one pint. Dissolve, and keep in an opaque stoppered bottle. The quantity

of this solution which fills the volumetric tube to 0, includes seventeen grains of nitrate of silver, or $\frac{1}{10}$ of an equivalent of the salt in grains.) The volumetric solution of nitrate of silver is made of such a strength that one hundred measures contain 17 grains (or $\frac{1}{10}$ of an equivalent) of nitrate of silver ($AgO, NO_5 = 170$). It is used for determining the strength of hydrocyanic acid. When nitrate of silver is added to a solution of hydrocyanic acid, to which an excess of soda has been added, it gives rise to the formation of a double salt, consisting of one equivalent of cyanide of sodium and one equivalent of cyanide of silver (NaCy, AgCy) which is precipitated at first, but re-dissolved on agitation. When all the hydrocyanic acid is withdrawn in the formation of this double cyanide, nitrate of silver gives rise to a precipitate no longer soluble; the appearance of this permanent precipitate is an indication that all the cyanogen is exhausted. The changes may be exhibited in the formula ($AgO, NO_5 + 2\ NaCy = NaO, NO_5 + NaCy, AgCy$). Hence it will be seen that each equivalent of nitrate of silver represents two of hydrocyanic acid. So that 17 grains (or $\frac{1}{10}$ of an equivalent) of nitrate of silver will correspond to 5·4 (2·7 × 2) grains, or $\frac{2}{10}$ of an equivalent in grains, of absolute hydrocyanic acid.

POSOLOGICAL TABLE.

THE following List exhibits the doses of important remedial agents and their preparations as ordinarily prescribed for adults. When medicines are administered to young children or very aged persons some modification is required; and the annexed Table, by Gaubius, will serve somewhat as a guide for the regulation of the doses for patients of different ages:

AGES.	PROPORTIONAL QUANTITIES.	DOSES.
For an adult	*suppose the dose to be* . . . *One*	*or* 60 *grains.*
Under 1 year	will require only . . . $\frac{1}{12}$	5 grains.
" 2 years	" " . . . $\frac{1}{8}$	$7\frac{1}{2}$ grains.
" 3 "	" " . . . $\frac{1}{6}$	10 grains.
" 4 "	" " . . . $\frac{1}{4}$	15 grains.
" 7 "	" " . . . $\frac{1}{3}$	20 grains.
" 14 "	" " . . . $\frac{1}{2}$	30 grains.
" 20 "	" " . . . $\frac{2}{3}$	40 grains.
Above 21 "	the full dose . . . . —	60 grains.
" 65 "	the inverse gradation of the above.	

It should be borne in mind, that certain drugs, especially *opium*, must be administered with great care to children, and that *mercurials* can be taken for a long time by such subjects without the ordinary symptoms of mercurialization being produced. Besides age, other circumstances, such as sex, temperament, climate and custom, have great influence on the action of medicines.

Absinthium (in powder) . . 20 gr. to 40 gr.
Acetum . . . . . 1 fl. drm. to 3 fl. drm., diluted.

Acidum Aceticum Dilutum	1 fl. drm. to 3 fl. drm., freely diluted.
Acidum Arseniosum	$\frac{1}{60}$ gr. to $\frac{1}{24}$ gr. to $\frac{1}{12}$ gr.
Acidum Benzoicum	10 gr. to 15 gr.
Acidum Carbolicum	1 min. to 3 min.
Acidum Citricum	10 gr. to 30 gr.
Acidum Gallicum	3 gr. to 20 gr.
Acidum Hydrochloricum Dilutum	10 min. to 30 min., freely diluted.
Acidum Hydrocianicum Dilutum	2 min. to 10 min.
Acidum Nitricum	1 min. to 5 min.
Acidum Nitricum Dilutum	10 min. to 30 min.
Acidum Nitro-Hydrochloricum Dilutum	3 min. to 6 min.
Acidum Phosphoricum Dilutum	10 min. to 30 min.
Acidum Sulphuricum Dilutum	5 min. to 25 min.
Acidum Sulphuricum Aromaticum	5 min. to 30 min.
Acidum Tannicum	3 gr. to 20 gr.
Acidum Tartaricum	10 gr. to 30 gr.
Aconitum (leaves)	2 gr. to 10 gr.
Æther	15 min. to 1 fl. drm.
Aloe Barbadensis (in powder)	2 gr. to 6 gr.
Aloe Socotrina (in powder)	2 gr. to 6 gr.
Alumen (as an astringent)	10 gr. to 20 gr.
Alumen (as a purgative)	30 gr. to 60 gr.
Ammoniacum (the gum resin)	10 gr. to 30 gr.
Ammoniæ Benzoas	10 gr. to 20 gr.
Ammoniæ Bicarbonas	10 gr. to 30 gr.
Ammoniæ Carbonas (as a stimulant)	3 gr. to 10 gr.
Ammoniæ Carbonas (as an emetic)	30 gr., freely diluted.
Ammoniæ Hydrochloras	5 gr. to 30 gr.
Ammoniæ Phosphas	5 gr. to 20 gr.
Antimonii Oxidum	1 gr. to 5 gr.
Antimonium Sulphuratum	1 gr. to 5 gr.
Antimonium Tartaratum (as a diaphoretic expectorant)	$\frac{1}{16}$ gr. to $\frac{1}{8}$ gr.
Antimonium Tartaratum (as a vascular depressant or sedative)	$\frac{1}{8}$ gr. to 2 gr.

Antimonium Tartaratum (as an emetic)	1 gr. to 3 gr.
Aqua	ad libitum.
Aqua Anethi	1 fl. oz. to 2 fl. oz.; for infants, 1 fl. drm. to 2 fl. drm.
Aqua Camphoræ	1 fl. oz. to 3 fl. oz.
Aqua Carui	1 fl. oz. to 2 fl. oz.
Aqua Cinnamomi	1 fl. oz. to 2 fl. oz.
Aqua Fœniculi	1 fl. oz. to 2 fl. oz.
Aqua Floris Aurantii	1 fl. oz. to 2 fl. oz.
Aqua Laurocerasi	10 min. to 30 min. or more.
Aqua Menthæ Piperitæ	1 fl. oz. to 2 fl. oz.
Aqua Menthæ Viridis	1 fl. oz. to 2 fl. oz.
Aqua Pimentæ	1 fl. oz. to 2 fl. oz.
Aqua Rosæ	1 fl. oz. to 2 fl. oz.
Aqua Sambuci	1 fl. oz. to 2 fl. oz.
Argenti Nitras	$\frac{1}{4}$ gr. to 1 gr.
Argenti Oxidum	$\frac{1}{2}$ gr. to 2 gr.
Assafœtida (the gum resin)	5 gr. to 30 gr.
Aurum (in powder)	$\frac{1}{4}$ gr. to 1 gr.
Auri Teroxidum	$\frac{1}{10}$ gr. and upwards.
Auri Terchloridum	$\frac{1}{20}$ gr. and upwards.
Auri et Sodii Chloridum	$\frac{1}{15}$ gr. and upwards.
Balsamum Peruvianum	10 min. to $\frac{1}{2}$ fl. drm.
Balsamum Tolutanum	10 gr. to 30 gr.
Beberiæ Sulphas	2 gr. to 10 gr.
Benzoinum (the balsam)	10 gr. to 30 gr.
Bismuthum Album	5 gr. to 20 gr.
Bismuthi Carbonas	5 gr. to 20 gr.
Bismuthi Nitras	5 gr. to 20 gr.
Bucco (powdered leaves)	20 gr. to 40 gr.
Calcis Carbonas Precipitata	20 gr. to 60 gr.
Calcii Chloridum	10 gr. and upwards.
Calomelas (as a purgative)	2 gr. to 6 gr.
Calomelas (as an alterative)	$\frac{1}{2}$ gr. to 1 gr., frequently repeated.
Calumba (in powder)	10 gr. to 60 gr.
Cambogia (the powdered resin)	1 gr. to 5 gr.
Camphora	5 gr. to 15 gr.

Canella (in powder)	15 gr. to 30 gr.
Capsicum (in powder)	1 gr. to 5 gr.
Carbo Animalis Purificatus	60 gr. to ½ oz.
Carbo Animalis Purificatus (as an antidote)	½ oz. to 2 oz.
Carbo Ligni	60 gr. to ½ oz.
Cardamomum (powdered Cardamoms)	5 gr. to 20 gr.
Caryophyllum (cloves in powder)	5 gr. to 20 gr.
Cascarilla (powdered bark)	10 gr. to 30 gr.
Cassia (the prepared pulp)	120 gr. and upwards.
Castoreum (in substance)	5 gr. to 15 gr.
Catechu (in powder)	10 gr. to 30 gr.
Cerii Oxalas	3 gr. to 5 gr.
Cerii Oxidum	3 gr. to 5 gr.
Chloroformum	1 min. to 10 min.
Cinchona (the powdered bark)	10 gr. to 60 gr.
Cinchoniæ Sulphas	1 gr. to 10 gr.
Cinchonidinæ Sulphas	1 gr. to 10 gr.
Cinchoniæ Hydrochloras	1 gr. to 10 gr.
Cinnamomum (powdered bark)	10 gr. to 30 gr.
Colchicum (the powdered corm.)	2 gr. to 8 gr.
Colocynth (the powdered pulp)	2 gr. and upwards.
Confectio Piperis	40 gr. to 120 gr.
Confectio Rosæ Caninæ	60 gr. or more.
Confectio Rosæ Gallicæ	60 gr. or more.
Confectio Scammonii	15 gr. to 30 gr. or more.
Confectio Sennæ	60 gr. to ½ oz.
Confectio Sulphuris	20 gr. to 120 gr.
Confectio Terebinthinæ	(for children as an anthelmintic) ¼ oz. to ½ oz.
Confectio Terebinthinæ	(for adults) ½ oz. to 1 oz.
Conium (the powdered leaves)	3 gr. to 10 gr.
Copaiba	15 min. to ½ fl. drm.
Copaibæ Oleum	5 min. to 20 min.
Coriandrum (the powdered fruit)	10 gr. to 30 gr.
Cortex Winteri	30 gr. to 60 gr.
Creosotum	1 min. to 3 min.
Creta Præparata	20 gr. to 60 gr.

Crocus (dried)	20 gr. and upwards.
Cubeba (the powder)	20 gr. to 120 gr.
Cubebæ Oleum	5 min. to 20 min.
Cupri Sulphas (as an astringent or tonic)	$\frac{1}{4}$ gr. to 2 gr.
Cupri Sulphas (as an emetic)	5 gr. to 8 gr.
Cusparia (in powder)	10 gr. to 40 gr.
Cusso	$\frac{1}{2}$ oz. for an adult, $\frac{1}{8}$ oz. to $\frac{1}{4}$ oz. for a child.
Decoctum Aloes Compositum	1 fl. oz. to 2 fl. oz.
Decoctum Cetrariæ	1 fl. oz. to 2 fl. oz.
Decoctum Chimaphilæ (*Lond.* 1851)	1 fl. oz. to 2 fl. oz.
Decoctum Cinchonæ Flavæ	1 fl. oz. to 2 fl. oz.
Decoctum Cydonii (*Lond.* 1851)	1 fl. oz. to 4 fl. oz.
Decoctum Granati Radicis	1 fl. oz. to 3 fl. oz.
Decoctum Hæmatoxyli	1 fl. oz. to 2 fl. oz.
Decoctum Hordei	ad libitum.
Decoctum Pareiræ	1 fl. oz. to 3 fl. oz.
Decoctum Quercûs	1 fl. oz. to 2 fl. oz.
Decoctum Sarsæ	1 fl. oz. to 4 fl. oz.
Decoctum Sarsæ Compositum	1 fl. oz. to 4 fl. oz.
Decoctum Scoparii	1 fl. oz. to 3 fl. oz.
Decoctum Taraxaci	1 fl. oz. to 2 fl. oz.
Decoctum Tormentillæ (*Lond.* 1851)	1 fl. oz. to 2 fl. oz.
Decoctum Ulmi (*Lond.* 1851)	1 fl. oz. to 4 fl. oz.
Digitalis (powdered leaves)	$\frac{1}{2}$ gr. to 2 gr.
Digitaline	$\frac{1}{40}$ gr. to $\frac{1}{10}$ gr.
Elaterium	$\frac{1}{12}$ gr. to $\frac{1}{2}$ gr.
Elaterine (crystallized)	$\frac{1}{24}$ gr. to $\frac{1}{6}$ gr.
Ergota (the powdered ergot)	20 gr. to 30 gr.
Extractum Aconiti (from juice)	1 gr. to 4 gr.
Extractum Aloes Barbadensis	2 gr. to 6 gr.
Extractum Aloes Socotrinæ	2 gr. to 6 gr.
Extractum Anthemidis	2 gr. to 6 gr.
Extractum Belæ Liquidum	1 fl. drm. to $\frac{1}{2}$ fl. oz.
Extractum Belladonnæ	$\frac{1}{6}$ gr. to 1 gr.
Extractum Calumbæ	2 gr. to 6 gr.

Extractum Cannabis Indicæ	¼ gr. to 1 gr. or more.
Extractum Cinchonæ Flavæ Liquidum	10 min. to 1 fl. drm.
Extractum Colchici	½ gr. to 2 gr.
Extractum Colchici Aceticum	½ gr. to 2 gr.
Extractum Colocynthidis Compositum	2 gr. to 10 gr.
Extractum Conii	2 gr. to 5 gr.
Extractum Ergotæ Liquidum	20 min. to 1 fl. drm.
Extractum Filicis Liquidum	30 min. to 2 fl. drm.
Extractum Gentianæ	5 gr. to 10 gr.
Extractum Glycyrrhizæ	10 gr. to 30 gr.
Extractum Hæmatoxyli	5 gr. to 20 gr.
Extractum Hyoscyami	5 gr. to 10 gr.
Extractum Jalapæ	5 gr. to 15 gr.
Extractum Krameriæ	5 gr. to 20 gr.
Extractum Lupuli	5 gr. to 20 gr.
Extractum Nucis Vomicæ	¼ gr. to 2 gr.
Extractum Opii	¼ gr. to 3 gr.
Extractum Opii Liquidum	3 min. to 30 min.
Extractum Pareiræ Liquidum	½ fl. drm. to 2 fl. drm.
Extractum Quassiæ	2 gr. to 5 gr.
Extractum Rhei	1 gr. to 5 gr.
Extractum Sarsæ Liquidum	½ fl. drm. to 2 fl. drm.
Extractum Stramonii	¼ gr. to 1½ gr.
Extractum Taraxaci	10 gr. to 30 gr.
Fel Bovinum (purif.)	5 gr. to 15 gr.
Ferri Ammonio-Chloridum	5 gr. to 15 gr.
Ferri Arsenias	$\frac{1}{10}$ gr. to ⅛ gr.
Ferri Carbonas Saccharata	5 gr. to 20 gr.
Ferri et Ammoniæ Citras	5 gr. and upwards.
Ferri et Quiniæ Citras	5 gr. to 20 gr.
Ferri Iodidum	1 gr. to 5 gr.
Ferri Oxidum Magneticum	3 gr. to 5 gr.
Ferri Perchloridi Liquor	3 min. to 10 min.
Ferri Pernitratis Liquor	30 min. to 1 fl. drm.
Ferri Peroxidum	10 gr. to 60 gr. or more.
Ferri Phosphas	5 gr. to 10 gr.
Ferri Sulphas	2 gr. to 10 gr.

Ferri Sulphas Exsiccata	1 gr. to 5 gr.
Ferri Sulphas Granulata	2 gr. to 10 gr.
Ferrum Redactum	1 gr. to 5 gr.
Ferrum Tartaratum	5 gr. to 30 gr.
Filix (of the powdered root)	60 gr. to 120 gr.
Galbanum (the gum resin)	10 gr. to 30 gr.
Gentiana (in powder)	10 gr. to 30 gr.
Glycerinum	½ fl. drm. to 2 fl. drm.
Guaiacum (the powdered resin)	10 gr. to 30 gr.
Hydrargyri Corrosivum Sublimatum	$\frac{1}{20}$ gr. to ¼ gr.
Hydrargyrum cum Cretâ	5 gr. to 15 gr.
Hydrargyri Sulphuretum (for fumigation)	30 gr. and upwards.
Hydrargyri Iodidum Rubrum	$\frac{1}{12}$ gr. to ⅓ gr.
Hydrargyri Iodidum Viride	1 gr. to 3 gr.
Infusum Anthemidis	1 fl. oz. to 4 fl. oz.
Infusum Aurantii	1 fl. oz. to 2 fl. oz.
Infusum Bucco	1 fl. oz. to 2 fl. oz.
Infusum Calumbæ	1 fl. oz. to 2 fl. oz.
Infusum Caryophylli	1 fl. oz. to 2 fl. oz.
Infusum Cascarillæ	1 fl. oz. to 2 fl. oz.
Infusum Catechu	1 fl. oz. to 2 fl. oz.
Infusum Chiratæ	1 fl. oz. to 2 fl. oz.
Infusum Cinchonæ Flavæ	1 fl. oz. to 2 fl. oz.
Infusum Cuspariæ	1 fl. oz. to 2 fl. oz.
Infusum Cusso	4 fl. oz. to 8 fl. oz.
Infusum Digitalis	2 fl. drm. to ½ fl. oz.
Infusum Dulcamaræ	1 fl. oz. to 4 fl. oz.
Infusum Ergotæ	1 fl. oz. to 2 fl. oz.
Infusum Gentianæ Compositum	1 fl. oz. to 2 fl. oz.
Infusum Krameriæ	1 fl. oz. to 2 fl. oz.
Infusum Lini	ad libitum.
Infusum Lupuli	1 fl. oz. to 2 fl. oz.
Infusum Maticæ	1 fl. oz. to 2 fl. oz.
Infusum Quassiæ	1 fl. oz. to 2 fl. oz.
Infusum Rhei	1 fl. oz. to 2 fl. oz.
Infusum Rosæ Acidum	1 fl. oz. to 2 fl. oz.
Infusum Senegæ	1 fl. oz. to 2 fl. oz.

Infusum Sennæ	1 fl. oz. to 2 fl. oz.
Infusum Serpentariæ	1 fl. oz. to 2 fl. oz.
Infusum Uvæ Ursi	1 fl. oz. to 2 fl. oz.
Infusum Valerianæ	1 fl. oz. to 2 fl. oz.
Inula (in powder)	30 gr. to 60 gr.
Iodine	½ gr., gradually increased.
Ipecacuanha (in powder, as an emetic)	15 gr. to 30 gr.
Ipecacuanha (in powder, as an expectorant)	¼ gr. to 2 gr.
Jalapa (powder)	10 gr. to 30 gr.
Jalapæ Resina	2 gr. to 6 gr.
Kamela	60 gr. to 120 gr.
Kino (in powder)	10 gr. to 20 gr.
Krameria (in powder)	20 gr. to 60 gr.
Lactucarium	5 gr. to 30 gr.
Liquor Ammoniæ	10 min. to 30 min.
Liquor Ammoniæ Fortior	3 min. to 10 min., freely diluted.
Liquor Ammoniæ Acetatis	10 min. to 40 min.
[Liquor Ammoniæ Acetatis. U.S.	½ fl. oz. to 1 fl. oz.]
Liquor Arsenicalis	2 min. to 5 min., occasionally to 10 min.
Liquor Arsenici et Hydrargyri Hydriodatis (Donovan's Solution)	10 min. to ½ fl. dr.
Liquor Calcis	½ fl. oz. to 2 fl. oz.
Liquor Calcis Saccharatus	15 min. to 1 fl. drm.
Liquor Chlori	10 min. to 30 min., freely diluted.
Liquor Morphiæ Hydrochloratis	20 min to 1 fl. drm.
[Liquor Morphiæ Sulphatis. U.S.	½ fl. drm. to 2 fl. drm.]
Liquor Potassæ	10 min. to 1 fl. drm., freely diluted.
Liquor Sodæ	10 min. to 1 fl. drm.
Liquor Sodæ Arseniatis	5 min. to 30 min.
Liquor Sodæ Chloratæ	10 min. to 20 min., freely diluted.
Liquor Strychniæ	5 min. to 15 min.

Lithiæ Carbonas	3 gr. to 6 gr.
Lithiæ Citras	5 gr. to 10 gr.
Lupulin	5 gr. to 10 gr.
Magnesia and Magnesia Levis (as an antacid)	10 gr. to 20 gr.
Magnesia (as a purgative or adjunct)	20 gr. to 60 gr.
Magnesiæ Carbonas (as an antacid)	10 gr. to 20 gr.
Magnesiæ Carbonas Levis (as a purgative)	20 gr. to 60 gr.
Magnesiæ Sulphas (as a purgative)	120 gr. to ½ oz. or more.
Magnesiæ Sulphas (as an adjunct to purgatives)	30 gr. and upwards.
Magnesiæ Sulphas (as a diuretic)	10 gr. to 30 gr.
Manganesii Sulphas (as a purgative)	60 gr. to 120 gr.
Manna	60 gr. to 120 gr.
Mastiche (resin, in powder)	20 gr. to 40 gr.
Matico (in powder)	30 gr. to 60 gr.
Mistura Ammoniaci	½ fl. oz. to 1 fl. oz.
Mistura Amygdalæ	1 fl. oz. to 2 fl. oz.
Mistura Guaiaci	1 fl. oz. to 1½ fl. oz.
Mistura Scammonii	2 fl. oz.
Mistura Spiritûs Vini Gallici	½ oz. to 1½ oz.
Mistura Ferri Composita	1 fl. oz. to 2 fl. oz.
Morphiæ Hydrochloras	⅛ gr. to 1 gr.
Mucilago Acaciæ	ad libitum.
Mucilago Tragacanthæ	1 fl. oz. and upwards.
Myristica (in powder)	5 gr. to 15 gr.
Myrrh (in powder)	10 gr. to 30 gr.
Nux Vomica (in powder)	1 gr. to 3 gr.
Oleum Amygdalæ	1 fl. drm. to ½ fl. oz.
Oleum Anethi	1 min. to 5 min.
Oleum Anisi	1 min. to 5 min.
Oleum Anthemidis	1 min. to 5 min.
Oleum Cajuputi	1 min. to 5 min.
Oleum Carui	1 min. to 5 min.
Oleum Caryophylli	1 min. to 5 min.
Oleum Cinnamomi	1 min. to 5 min.

Oleum Copaibæ	5 min. to 20 min.
Oleum Coriandri	1 min. to 5 min.
Oleum Crotonis	½ min. to 2 min.
Oleum Cubebæ	5 min. to 20 min.
Oleum Juniperi	1 min. to 10 min.
Oleum Lavandulæ	1 min. to 5 min.
Oleum Limonis	1 min. to 5 min.
Oleum Menthæ Piperitæ	1 min. to 5 min.
Oleum Menthæ Viridis	1 min. to 5 min.
Oleum Morrhuæ	1 fl. drm. to ½ fl. oz.
Oleum Myristicæ	1 min. to 5 min.
Oleum Olivæ	1 fl. drm. to 1 fl. oz.
Oleum Pimentæ	1 min. to 5 min.
Oleum Pulegii	1 min. to 5 min.
Oleum Ricini	1 fl. drm. to 1 fl. oz.
Oleum Rosmarini	1 min. to 5 min.
Oleum Rutæ	1 min. to 5 min.
Oleum Sabinæ	1 min. to 5 min.
Oleum Sassafras	1 min. to 5 min.
Oleum Terebinthinæ) as stimulant and diuretic	10 min. to 30 min.
Oleum Terebinthinæ (as an anthelmintic purgative)	2 fl. drm. to 6 fl. drm.
Opium (powdered)	½ gr. to 4 gr.
Oxymel	1 fl. drm. to ½ fl. oz.
Pareira (in powder)	30 gr. to 60 gr.
Pepsina	15 gr. to 20 gr.
Pepsina Porci	2 gr. to 4 gr.
Petroleum	30 min. to 1 fl. drm.
Phosphorus	$\frac{1}{40}$ gr. to $\frac{1}{10}$ gr.
Pilula Aloes Barbadensis	4 gr. to 10 gr.
Pilula Aloes et Assafœtidæ	4 gr. to 15 gr.
Pilula Aloes et Myrrhæ	5 gr. to 15 gr.
Pilula Aloes Socotrinæ	4 gr. to 10 gr.
Pilula Assafœtidæ Composita	5 gr. to 15 gr.
Pilula Calomelanos Composita (as an alterative)	5 gr. to 10 gr.
Pilula Cambogiæ Composita	5 gr. to 15 gr.
Pilula Colocynthidis Composita	5 gr. to 12 gr.

Pilula Colocynthidis et Hyoscyami	5 gr. to 15 gr.
Pilula Ferri Carbonatis	5 gr. to 20 gr.
Pilula Ferri Iodidi	2½ gr. to 7 gr.
Pilula Hydrargyri	3 gr. to 10 gr.
Pilula Opii	2½ gr. and upwards.
Pilula Plumbi cum Opio	4 gr. to 8 gr.
Pilula Rhei Composita	10 gr. to 20 gr.
Pilula Scillæ Composita	5 gr. to 10 gr.
Pimenta (in powder)	5 gr. to 20 gr.
Piper (nigrum)	5 gr. to 10 gr.
Piperine	5 gr. to 10 gr.
Plumbi Acetas	½ gr. to 3 gr.
Plumbi Iodidum	¼ gr. to 1 gr.
Podophyllum (in powder)	10 gr. to 20 gr.
Podophylli Resina (Podophylline)	¼ gr. to 2 gr.
Potassa Sulphurata	3 gr. to 6 gr., freely diluted.
Potassæ Acetas (as a diuretic)	10 gr. to 20 gr.
Potassæ Acetas (as a purgative)	120 gr. and upwards.
Potassæ Bicarbonas (as an antacid)	10 gr. to 30 gr.
Potassæ Bicarbonas (in acute rheumatism)	30 gr. to 40 gr., freely diluted.
Potassæ Carbonas	10 gr. to 20 gr.
Potassæ Chloras	10 gr. to 20 gr.
Potassæ Citras	20 gr. to 60 gr.
Potassæ Nitras (as a refrigerant and diuretic)	5 gr. to 20 gr.
Potassæ Nitras (as a vascular sedative)	20 gr. to 30 gr.
Potassæ Sulphas (as a purgative)	20 gr. to 120 gr.
Potassæ Tartras (as a diuretic and alterative)	10 gr. to 60 gr.
Potassæ Tartras (as a purgative)	120 gr. to 200 gr.
Potassæ Tartras Acida (as a refrigerant or diuretic)	20 gr. to 60 gr.

Potassæ Tartras Acida (as a hydragogue purgative)	120 gr. to 200 gr.
Potassii Bromidum	3 gr. to 15 gr.
Potassii Iodidum	1 gr. to 10 gr.
Pulvis Amygdalæ Compositus	60 gr. to 120 gr.
Pulvis Antimonialis	3 gr. to 15 gr.
Pulvis Aromaticus	10 gr. to 30 gr.
Pulvis Catechu Compositus	15 gr. to 30 gr.
Pulvis Cretæ Aromaticus	20 gr. to 120 gr.
Pulvis Cretæ Aromaticus cum Opio	10 gr. to 60 gr.
Pulvis Ipecacuanhæ cum Opio	5 gr. and upwards.
Pulvis Jalapæ Compositus	10 gr. to 30 gr.
Pulvis Kino cum Opio	10 gr. and upwards.
Pulvis Rhei Compositus	5 gr. to 10 gr. for children, 20 gr. to 60 gr. for an adult.
Pulvis Scammonii Compositus	5 gr. to 20 gr.
Pulvis Tragacanthæ Compositus	20 gr. and upwards.
Quassia (in powder)	10 gr. to 20 gr.
Quiniæ Sulphas	1 gr. to 10 gr.
Quiniæ Valerianas	1 gr. to 5 gr.
Rheum (powdered rhubarb—as a stomachic)	1 gr. to 5 gr.
Rheum (powdered rhubarb—as a purgative)	10 gr. to 30 gr.
Rhus Toxicodendron (powdered leaves)	½ gr. to 1 gr.
Ruta (powdered leaves)	20 gr. to 40 gr.
Sabina (the leaves, in powder)	5 gr. and upwards.
Sagapenum (the gum resin)	10 gr. to 30 gr.
Sanguinaria (as an expectorant)	3 gr. to 5 gr.
Sanguinaria (as an emetic)	10 gr. to 20 gr.
Santonica (worm seed)	60 gr. to 120 gr.
Santoninum (Santonin — crystallized)	1 gr. to 3 gr. for a child, 3 gr. to 6 gr. for an adult.
Sapo Durus, or Sapo Mollis (as antacids)	5 gr. to 20 gr.
Scammonium (gum resin in powd.)	4 gr. to 10 gr.

Scammonin (the pure resin)	4 gr. to 10 gr.
Senega (in powder)	20 gr. to 60 gr.
Senna (powdered leaves)	30 gr. to 120 gr.
Serpentaria (in powder)	10 gr. to 20 gr.
Simarubra (in powder)	15 gr. to 30 gr.
Sinapis (as an emetic)	from a dessert to a tablespoonful.
Sodæ Acetas	20 gr. to 60 gr.
Sodæ Arsenias (in crystals)	$\frac{1}{5}$ gr. to $\frac{1}{2}$ gr.
Sodæ Arsenias (dried at 300°)	$\frac{1}{10}$ gr. to $\frac{1}{4}$ gr.
Sodæ Biboras	10 gr. to 60 gr.
Sodæ Bicarbonas	10 gr. to 60 gr.
Sodæ Carbonas	10 gr. to 30 gr.
Sodæ Carbonas Exsiccata	5 gr. to 15 gr.
Sodæ et Potassæ Tartras (as a diuretic)	30 gr. to 60 gr.
Sodæ et Potassæ Tartras (as a purgative)	120 gr. to $\frac{1}{2}$ oz.
Sodæ Phosphas (as a diuretic)	30 gr. to 120 gr.
Sodæ Phosphas (as a purgative)	$\frac{1}{2}$ oz. to 1 oz.
Sodæ Sulphas	$\frac{1}{2}$ oz. to 1 oz.
Sodæ Sulphis	20 gr. to 60 gr.
Sodæ Valerianas	$\frac{1}{2}$ gr. to 2 gr.
Spigelia (in powder)	60 gr. to 120 gr.
Spiritus Ætheris	30 min. to $1\frac{1}{2}$ fl. drm.
Spiritus Ætheris Nitrosi	30 min. to 2 fl. drm.
Spiritus Ammoniæ Aromaticus	20 min. to 1 fl. drm.
Spiritus Armoraciæ Compositus	1 fl. drm. to 3 fl. drm.
Spiritus Cajuputi	10 min. to 1 fl. drm.
Spiritus Camphoræ	10 min. to 30 min.
Spiritus Chloroformi (Chloric Ether)	10 min. to 30 min.
Spiritus Juniperi	20 min. to $1\frac{1}{2}$ fl. drm.
Spiritus Lavandulæ	10 min. to 50 min.
Spiritus Menthæ Piperitæ	5 min. to 50 min.
Spiritus Myristicæ	5 min. to 50 min.
Spiritus Pyroxylicus	10 min. and upwards.
Spiritus Rosmarini	10 min. to 50 min.
Staphisagria	3 gr. to 10 gr.

Stramonium (the leaves, powdered)	1 gr. and upwards.
Strychnia	$\frac{1}{32}$ gr. to $\frac{1}{8}$ gr.
Styrax Præparatus	5 gr. to 20 gr.
Succus Limonis	1 fl. drm. to 4 fl. drm.
Succus Scoparii	1 fl. drm. to $\frac{1}{2}$ fl. oz.
Succus Conii	30 min. to $1\frac{1}{2}$ fl. drm.
Succus Taraxaci	$\frac{1}{2}$ fl. drm. to 2 fl. drm.
Succus Mori	ad libitum.
Sulphuris Iodidum	$\frac{1}{2}$ gr. to 3 gr.
Sulphur Præcipitatum (as a stimulant)	10 gr. to 20 gr.
Sulphur Præcipitatum (as a laxative)	30 gr. to 60 gr.
Sulphur Sublimatum (as a stimulant)	10 gr. to 20 gr.
Sulphur Sublimatum (as a laxative)	30 gr. to 60 gr.
Sumbul (in powder)	20 gr. to 60 gr.
Syrupus	ad libitum.
Syrupus Althææ	1 fl. drm. to 1 fl. oz.
Syrupus Aurantii	1 fl. drm. to 2 fl. drm.
Syrupus Aurantii Floris	1 fl. drm. to 2 fl. drm.
Syrupus Ferri Iodidi	20 min. to 1 fl. drm.
Syrupus Ferri Phosphatis	1 fl. drm. to 3 fl. drm.
Syrupus Hemidesmi	1 fl. drm. to 2 fl. drm.
Syrupus Limonis	1 fl. drm. to 2 fl. drm.
Syrupus Mori	ad libitum.
Syrupus Papaveris	1 fl. drm. to $\frac{1}{2}$ fl. oz.; for children, $\frac{1}{2}$ fl. drm.
Syrupus Rhamni (*Lond.* 1851)	$\frac{1}{2}$ fl. oz. to 1 fl. oz.; for children, $\frac{1}{2}$ fl. drm. to 2 fl. drm.
Syrupus Rhœados	1 fl. drm. and upwards.
Syrupus Rosæ Gallicæ	1 fl. drm. and upwards.
Syrupus Scillæ	$\frac{1}{2}$ fl. drm. to $1\frac{1}{2}$ fl. drm.
Syrupus Sennæ	1 fl. drm. and upwards.
Syrupus Tolutanus	1 fl. drm. to 2 fl. drm.
Syrupus Violæ (*Lond.* 1851)	$\frac{1}{2}$ fl. drm. to 2 fl. drm.
Syrupus Zingiberis	$\frac{1}{2}$ fl. drm. to 1 fl. drm.

Tamarindus	½ oz. and upwards.
Tinctura Aconiti	3 min. to 10 min.
Tinctura Actææ Racemosæ	30 min. to 60 min.
Tinctura Aloes	1 fl. drm. to 3 fl. drm.
Tinctura Assafœtidæ	30 min. to 1½ fl. drm.
Tinctura Aurantii	1 fl. drm. to 2 fl. drm.
Tinctura Belladonnæ	5 min. to 30 min.
Tinctura Benzoini Composita	½ fl. drm. to 1½ fl. drm.
Tinctura Bucco	1 fl. drm. to 2 fl. drm.
Tinctura Calumbæ	½ fl. drm. to 1½ fl. drm.
Tinctura Camphoræ cum Opio	1 fl. drm. to 2 fl. drm.
Tinctura Cannabis Indicæ	5 min. to 30 min.
Tinctura Cantharidis	5 min. to 30 min.
Tinctura Capsici	3 min. to 10 min.
Tinctura Cardamomi Composita	½ fl. drm. to 2 fl. drm.
Tinctura Cascarillæ	½ fl. drm. to 1½ fl. drm.
Tinctura Castorei	½ fl. drm. to 2 fl. drm.
Tinctura Catechu	1 fl. drm. to 2 fl. drm.
Tinctura Chiratæ	½ fl. drm. to 1½ fl. drm.
Tinctura Cinchonæ Composita	1 fl. drm. to 2 fl. drm.
Tinctura Cinchonæ Flavæ	1 fl. drm. to 2 fl. drm.
Tinctura Cinnamomi	1 fl. drm. to 2 fl. drm.
Tinctura Cocci	½ fl. drm. to 1½ fl. drm.
Tinctura Colchici Seminis	10 min. to ½ fl. drm.
Tinctura Conii Fructus	20 min. to 1 fl. drm. and upwards.
Tinctura Croci	1 drm. to 1¹ fl. drm.
Tinctura Digitalis	5 min. to 40 min. and upwards.
Tinctura Ergotæ	½ fl. drm. to 1½ fl. drm.
Tinctura Ferri Perchloridi	10 min. to 40 min.
Tinctura Ferri Ammonio-Chloridi	10 min. to ½ fl. drm.
Tinctura Gallæ	½ fl. drm. to 1½ fl. drm.
Tinctura Gentianæ Composita	1 fl. drm. to 1½ fl. drm.
Tinctura Guaiaci Ammoniata	½ fl. drm. to 1½ fl. drm.
Tinctura Hellebori (*Lond.* 1851)	30 min. to 1 fl. drm.
Tinctura Hyoscyami	20 min. to 1 fl. drm. or more.
Tinctura Iodi	5 min. to 20 min.
Tinctura Jalapæ	½ fl. drm. to 2 fl. drm.

Tinctura Kino	½ fl. drm. to 2 fl. drm.
Tinctura Krameriæ	½ fl. drm. to 1½ fl. drm.
Tinctura Lavandulæ Composita	20 min. to 1 fl. drm. or more.
Tinctura Limonis	1 fl. drm. to 2 fl. drm.
Tinctura Lobeliæ	10 min. to ½ fl. drm.
Tinctura Lobeliæ Ætherea	10 min. to ½ fl. drm.
Tinctura Lupuli	½ fl. drm. to 2 fl. drm.
Tinctura Myrrhæ	½ fl. drm. to 1 fl. drm.
Tinctura Nucis Vomicæ	10 min. to ½ fl. drm.
Tinctura Opii	4 min. to 40 min.
Tinctura Quiniæ Composita	1 fl. drm. to 2 fl. drm.
Tinctura Rhei (as a stomachic)	1 fl. drm. to 2 fl. drm.
Tinctura Rhei (as a purgative)	½ fl. oz. to 1 fl. oz.
Tinctura Sabinæ	20 min. to 1 fl. drm.
Tinctura Sanguinariæ	20 min. to 1 fl. drm.
Tinctura Scillæ	10 min. to 20 min.
Tinctura Senegæ	½ fl. drm. to 2 fl. drm.
Tinctura Sennæ	1 fl. drm. to ½ fl. oz.
Tinctura Serpentariæ	½ fl. drm. to 1½ fl. drm.
Tinctura Stramonii	10 min. to ½ fl. drm.
Tinctura Sumbul	1 fl. drm. to 2 fl. drm. (2 oz. to 16 oz. of spirit).
Tinctura Tolutana	½ fl. drm. to 1 fl. drm.
Tinctura Valerianæ	1 fl. drm. to 2 fl. drm.
Tinctura Valerianæ Ammoniata	½ fl. drm. to 1½ fl. drm.
Tinctura Veratri Viride	5 min. to 15 min.
Tinctura Zingiberis	10 min. to 30 min.
Tormentilla (in powder)	20 gr. to 60 gr.
Tragacantha (in powder)	20 gr. and upwards.
Trochisci Acidi Tannici	*one* to *four* or more.
Trochisci Bismuthi	*one* to *four* or more.
Trochisci Catechu	*one* to *four* or more.
Trochisci Morphiæ	*one* to *four* or more.
Trochisci Morphiæ et Ipecacuanhæ	*one* to *four* or more.
Trochisci Opii	*one* to *four* or more.
Uva Ursæ (powdered leaves)	10 gr. to 30 gr.
Valeriana (in powder)	10 gr. to 30 gr.
Veratria (the alkaloid)	$\frac{1}{12}$ gr. to $\frac{1}{6}$ gr.

Veratrum Viride (powdered rhizome)	1 gr. to 3 gr.
Vinum Aloes	1 fl. drm. to 2 fl. drm.
Vinum Antimoniale (in febrile affections)	10 min. to 30 min.
Vinum Antimoniale (as an emetic)	½ fl. oz. to 1 fl. oz.
Vinum Colchici	10 min. to ½ fl. drm.
Vinum Ferri	1 fl. drm. to 3 fl. drm.
Vinum Ipecacuanhæ (as an expectorant)	5 min. to 15 min.
Vinum Ipecacuanhæ (as an emetic)	2 fl. drm. to 6 fl. drm.
Vinum Opii	4 min. to 40 min.
Vinum Veratri (*Lond.* 1851)	10 min. to 20 min.
Zinci Acetas	1 gr. to 5 gr.
Zinci Carbonas	1 gr. to 5 gr. or more.
Zinci Chloridum	½ gr. to 1 gr. or 2 gr.
Zinci Oxidum	1 gr. to 5 gr. or more.
Zinci Sulphas (as a tonic or astringent)	1 gr. to 5 gr.
Zinci Sulphas (as an emetic)	10 gr. to 30 gr.
Zinci Valerianas	½ gr. to 3 gr.
Zingiber (in powder)	10 gr. to 30 gr.

TABLE

Showing the Proportions in which some of the more important Drugs of the Pharmacopœia are contained in the Officinal Preparations.

ANTIMONY.

(Tartar Emetic.)

$\frac{1}{4}$ gr. of tartarated antimony is contained in 1 fl. drm. of vinum antimoniale.

1 gr. of tartarated antimony is contained in 5 gr. of unguentum antimoniale.

[$\frac{1}{8}$ gr. of tartrate of antimony and rotana is contained in 1 fl. dr. of syrupus scillæ compositus. U. S.]

(Teroxide of Antimony.)

1 gr. of oxide of antimony is contained in 3 gr. of pulvis antimonialis.

ARSENIC.

(Arsenious Acid, White Arsenic.)

$\frac{1}{24}$ gr. of arsenious acid is contained in 5 min. of liquor arsenicalis.

(Arseniate of Soda.)

$\frac{1}{24}$ gr. of arseniate of soda (dried) is contained in 5 min. of liquor sodæ arseniatis.

MERCURY.

(Metallic.)

1 gr. of mercury is contained in 3 gr. of hydrargyrum cum cretâ.

[3 gr. of mercury are contained in 8 gr. of hydrargyrum cum cretâ. U. S.]

1 gr. of mercury is contained in 3 gr. of pilula hydrargyri.

1 gr. of mercury is contained in about 2 gr. of unguentum hydrargyri.

(Calomel.)

1 gr. of calomel is contained in 5 gr. of pilula calomelanos composita.

[1 gr. of mild chloride of mercury is contained in each pill of the pilulæ antimonii compositæ. U. S.]

1 gr. of calomel is contained in about 6½ gr. of unguentum calomelanos.

ACONITE.

1 gr. of dried aconite root is contained in about 9 min. of tinctura aconiti.

[1 gr. of dried aconite root is contained in rather less than 3 min. of tinctura aconiti radicis. U. S.]

ACONITIA.

8 gr. of aconitia are contained in 1 oz. of unguentum aconitiæ.

ATROPIA.

1 gr. of atropia is contained in 2 fl. drm. of liquor atropiæ.

8 gr. of atropia are contained in 1 oz. of unguentum atropiæ.

BELLADONNA.

1 gr. of dried belladonna is contained in about 22 min. of tinctura belladonnæ.

[1 gr. of dried belladonna is contained in 8 min. of tinctura belladonna. U. S.]

Each fluid part of linimentum belladonnæ contains the active portion of a solid part of the dried root.

CANNABIS INDICA.

1 gr. of alcoholic extract of Indian hemp is contained in about 22 min. of tinctura cannabis Indicæ.

CANTHARIDES.

1 gr. of cantharides is contained in about 88 min. of tinctura cantharidis.

[1 gr. of cantharides is contained in 32 min. of tinctura cantharidis. U. S.]

COLCHICUM.

1 gr. of dried corm of colchicum is contained in about 5½ min. of vinum colchici.

[1 gr. of dried corm of colchicum is contained in about $2\frac{2}{3}$ min. of vinum colchici radicis. U. S.]

1 gr. of colchicum seeds is contained in about 9 min. of tinctura colchici.

[1 gr. of colchicum seeds is contained in 8 min. of vinum colchici seminis. U. S.]

DIGITALIS.

1 gr. of dried leaves of digitalis is contained in about 9 min. of tinctura digitalis.

[1 gr. of dried digitalis leaves is contained in 8 min. of tinctura digitalis. U. S.]

HEMLOCK.

1 gr. of hemlock fruit is contained in about 9 min. of tinctura conii fructus.

[1 gr. of dried leaves of conium is contained in 8 min. of tinctura conii. U. S.]

IPECACUAN.

1 gr. of ipecacuanha root is contained in about 22 min. of vinum ipecacuanhæ.

[1 gr. of ipecacuanha root is contained in 16 min. of vinum ipecacuanhæ. U. S.]

1 gr. of ipecacuanha root is contained in *twelve* morphia and ipecacuanha lozenges.

[1 gr. of ipecacuanha is contained in 16 min. of syrupus ipecacuanhæ. U. S.]

NUX VOMICA.

1 gr. of nux vomica seed is contained in about 11 min. of tinctura nucis vomicæ.

[1 gr. of nux vomica is contained in 4 min. of tinctura nucis vomicæ. U. S.]

(STRYCHNIA.)

1 gr. of strychnia is contained in 2 fl. drm. of liquor strychniæ.

OPIUM.

(HYDROCHLORATE OF MORPHIA.)

$\frac{1}{4}$ gr. of hydrochlorate of morphia is contained in 30 min. of liquor morphiæ hydrochloratis.

$\frac{1}{4}$ gr. of hydrochlorate of morphia is contained in *nine* morphia lozenges.

$\frac{1}{4}$ gr. of hydrochlorate of morphia is contained in *nine* morphia and ipecacuanha lozenges.

$\frac{1}{4}$ gr. of hydrochlorate of morphia is contained in *each* morphia suppository.

[$\frac{1}{8}$ gr. of sulphate of morphia is contained in the fl. drm. of liquor morphiæ sulphatis. U. S.]

(Opium dried sufficiently to be powdered.)

1 gr. of opium is contained in $14\frac{1}{2}$ min. of tinctura opii.

[1 gr. of opium is contained in 12·8 min. of tinctura opii. U. S.]

1 gr. of opium is contained in $14\frac{1}{2}$ min. of vinum opii.

[1 gr. of opium is contained in 8 min. of vinum opii. U. S.]

1 gr. of opium is contained in $\frac{1}{2}$ fl. oz. of tinctura camphoræ cum opio.

1 gr. of opium is contained in 2 fl. oz. of enema opii.

1 gr. of opium is contained in 5 gr. of pilula opii (pilula saponis cum opii).

[1 gr. of opium is contained in each pill of pilulæ opii and of pilulæ saponis composita. U. S.]

1 gr. of opium is contained in 8 gr. of pilula plumbi cum opio.

1 gr. of opium is contained in 10 gr. of pulvis ipecacuanhæ cum opio (pulvis ipecacuanhæ compositus).

1 gr. of opium is contained in 20 gr. of pulvis kino cum opio.

1 gr. of opium is contained in 40 gr. of pulvis cretæ aromaticus cum opio.

[1 gr. of opium is contained in 36 gr. of confectis opii. U. S.]

1 gr. of opium is contained in about $14\frac{1}{2}$ gr. of unguentum gallæ cum opio.

1 gr. of opium is contained in *ten* opium lozenges.

[1 gr. of opium is contained in *twelve* troches of liquorice and opium. U. S.]

1 gr. of opium equals about $\frac{1}{2}$ gr. of extractum opii.

1 gr. of extract of opium is contained in 22 min. of extractum opii liquidum.

GRANULAR EFFERVESCING SALTS.

Within the last few years medicines have been somewhat extensively used in the form of granular effervescing powders, prepared by a peculiar process.

Their basis consists of a combination of tartaric and citric acids with bicarbonate of soda, reduced to fine powder, and then mixed and subjected to heat, by which a mass is formed capable of being passed through a coarse sieve, and the mixture is thus made to assume a granular form. The citric acid is essential to yield up its water of crystallization in order to reduce the whole to a pasty condition; frequent stirring must be employed when the mixed powder is heated.

During this process of granulation, only a small amount of carbonic acid is given off, and hence, when the prepared salts are dissolved in water, brisk effervescence ensues.

Many powerful remedial agents may be united with the mixed powder during granulation, and the following are the more important of these preparations.

The basis itself is called Citro-Tartrate of Soda; with this 25 per cent. of sulphate of magnesia is often mixed to increase the aperient action; and to the same basis the following salts may be united:— Citrate of Iron, Citrate of Iron and Quinine, Citrate of Quinine, Iodide of Iron, Carbonate of Iron, Citrate of Lithia, Nitrate of Potash, Carlsbad, Püllna, and Vichy Salts in varying proportions.

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